

Free-Standing Mathematics Qualification

General Certificate of Education

FSMQ & Use of Mathematics

Teachers' Guide

MANAGING MONEY (6981)
WORKING IN 2 & 3 DIMENSIONS (6982)
MAKING SENSE OF DATA (6983)
CALCULATING FINANCES (6984)
HANDLING & INTERPRETING DATA (6986)
USING ALGEBRA, FUNCTIONS & GRAPHS (6988)
USING & APPLYING STATISTICS (6990)
WORKING WITH ALGEBRAIC & GRAPHICAL TECHNIQUES (6991)
MODELLING WITH CALCULUS (6992)
USING & APPLYING DECISION MATHEMATICS (6994)
AS USE OF MATHEMATICS (5351)

Copyright © AQA 2006 and its licensors. All rights reserved.

COPYRIGHT

AQA retains the copyright on all its publications, including the specimen units and mark schemes/teachers' guides. However, the registered centres of AQA are permitted to copy material from this booklet for their own internal use, with the following important exception: AQA cannot give permission to centres to photocopy any material that is acknowledged to a third part even for internal use within the centre.

Contents

Background Information

- | | | |
|---|-------------------------------|---|
| 1 | Introduction | 4 |
| 2 | Choosing a Programme of Study | 7 |

Scheme of Assessment

- | | | |
|---|---|----|
| 3 | External Assessment | 12 |
| 4 | Portfolio | 14 |
| 5 | Frequently Asked Questions and Notes, by Unit | 22 |

Course Organisation

- | | | |
|---|------------------------|----|
| 6 | Delivery of the Course | 27 |
| 7 | Support Material | 30 |

Appendix

- | | | |
|---|--|----|
| A | Changes in 2007 Specifications from 2006 | 32 |
|---|--|----|

Background Information

1

Introduction

1.1 Introduction

This Teachers' Guide has been provided to assist teachers and lecturers in their preparation for the delivery of courses based on the AQA Advanced Subsidiary (AS) in Use of Mathematics and the Free-Standing Mathematics Qualifications (FSMQ). The guide should be read in conjunction with the specifications and the specimen material that accompanies them. These are available in hard copy and also on the AQA Website www.aqa.org.uk.

1.2 The revised specifications

The FSMQ and AS Use of Mathematics specifications have been revised to clarify portfolio marking and to introduce a new unit at advanced level (Using & Applying Decision Mathematics, 6994). Changes are side barred in the 2007 specifications and are briefly summarised in Appendix A of this Teachers' Guide.

1.3 Who should study FSMQ?

- Students who need to study specific mathematical topics to enable them to enhance and support other areas of work, study or interests, e.g. Modelling with Calculus (advanced level) will support studies in Science, Economics, Business Studies and Technology. Working in 2 and 3 Dimensions (foundation level) supports studies in Technology, Art and Design.
- Advanced students who need to develop specific mathematical knowledge and skills beyond GCSE, without having to follow an academic mathematics course, eg AS Mathematics, in support of the subject they are studying.
- Weaker or unmotivated students who are unable to achieve a grade in GCSE Mathematics but who need real-life mathematical skills. (You may also like to consider Entry Level Certificates for students struggling with GCSE; AQA offers two of these.)

One textbook publisher's website has stated in the past that foundation and intermediate level FSMQ is at the same level as AS and GNVQ; this is **not** the case. Foundation FSMQ examines approximately the same level of mathematics as GCSE grades D–G, while intermediate FSMQ covers mathematics at around the level of GCSE grade A*–C.

As a rough guide: a grade A at AS Use of Mathematics should be attainable to students achieving a B at higher tier GCSE. Students earning a C at intermediate tier GCSE are likely to achieve a B or C in Use of Mathematics unless they are very motivated.

What age groups can study FSMQ?

FSMQ and Use of Mathematics are now accredited by QCA for both pre-16 and post-16 students at all three levels.

1.4 How do other centres use FSMQ?

There are many ways in which FSMQ can be a valuable addition to the curriculum. Advanced FSMQ is suitable for students still in Key Stage 4 who have taken GCSE Mathematics early. In the post-16 sector, they can be used to boost GCSE grade C students, particularly those who have taken Intermediate tier GCSE, before a traditional Mathematics A Level. FSMQ has been found to be very motivating for lower achieving post-16 students because the subject content is relevant to everyday life and the assessment uses real-life situations.

Section 7.3 of this guide details a scheme to facilitate centres contacting each other about these courses.

1.5 How do FSMQ and Use of Mathematics fit with other qualifications available in mathematics?

Qualifications such as GCSE and A Level are assigned to a level in the National Qualifications Framework, which can be viewed on QCA's website: www.qca.org.uk. FSMQ Foundation, Intermediate and Advanced are level 1, 2 and 3 qualifications respectively.

Level in National Qualifications Framework	Qualifications of notionally equivalent demand
3	A Levels Level 3 NVQ AS Use of Mathematics & Advanced FSMQ
2	GCSE grade A*– C Level 2 NVQ Intermediate FSMQ
1	GCSE grade D – G Level 1 NVQ Foundation FSMQ
Entry	Entry Level Certificate

Two Advanced FSMQ units can form part of an AS in Use of Mathematics, but there is no mechanism for Foundation or Intermediate FSMQ units to be “cashed in” for a GCSE.

1.6 Grading and UCAS points

Each FSMQ is graded A to E. Candidates who fail to reach the minimum standard for grade E will be recorded as U (unclassified) and will not receive a qualification certificate.

Advanced FSMQ attracts UCAS points as shown in the table.

FSMQ Advanced Unit Grade	A	B	C	D	E
UCAS points	20	17	13	10	7

For comparison, a grade E in any AS qualification earns 20 points.

AS Use of Mathematics is also graded A to E and has the same

UCAS points tariff as all other AS qualifications. Candidates who are recorded as U in AS Use of Mathematics may still achieve a higher grade in one or both of the Advanced FSMQs they have taken; in this case, each FSMQ will be awarded UCAS points as shown in the table above.

Intermediate and Foundation FSMQ do not earn UCAS points.

Points for admission to FE colleges are fixed by the individual colleges themselves not by an external agency like UCAS or QCA; enquiries about the value of FSMQ at this level would be best directed to your local FE colleges.

Now that FSMQ is fully approved for pre-16 students, points for them will also count in school performance tables. See the DfES website www.dfes.gov.uk for current tariffs.

1.7 Funding

All FSMQ units and Use of Mathematics are approved from 2007 under sections 96 and 97 of the Learning and Skills Act 2000, so the LSC will fund them.

Learning aim reference numbers for the LSC are currently as follows. You will be able to confirm these on the LSC website www.lsc.gov.uk by searching the Learning Aim Database.

Qualification	Learning Aim Ref No	Qualification	Learning Aim Ref No	Qualification	Learning Aim Ref No
6981	10006576	6986	10006631	6992	10006758
6982	10006515	6988	10006692	6994	*
6983	10006564	6990	10006813	5351	10013301
6984	10006746	6991	10006801		

* At the time of going to press, the new unit, 6994 Using & Applying Decision Mathematics, does not yet have a number assigned.

1.8 Contact details

You can contact the subject office by email: mathematics-gce@aqa.org.uk or by telephone 01483 477738 with queries about the specifications and subject content, assessment, coursework standardising meetings and past papers over two years old.

Our Publications section can be contacted at: publications@aqa.org.uk or by calling 0870 410 1036 for recent past papers and other publications or orders of multiple copies. Note that we do not produce or sell textbooks.

Teacher Support may be running meetings to assist teachers in the delivery of FSMQ or Use of Mathematics. You can contact them at: teachersupport@aqa.org.uk. You can also book onto teacher support meetings online using the AQA website. Note that coursework standardising meetings are **not** organised by teacher support but by the subject office.

FSMQ and Use of Mathematics are growing subjects and sometimes require new markers and moderators. If you would like to mark examination scripts or moderate portfolios, please contact ProcessingExaminers-G@qa.org.uk. This is paid work and can offer valuable insight into the assessment process for subject teachers.

2

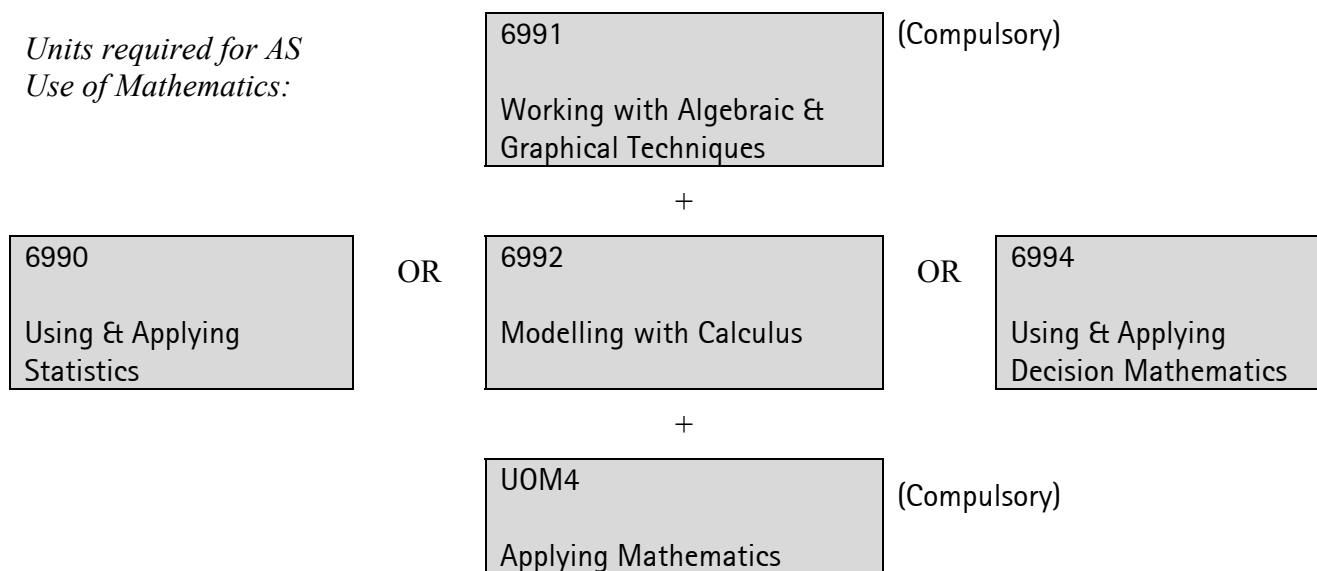
Choosing a Programme of Study

2.1 Do I have to take more than one unit?

FSMQ units are designed as stand alone courses. You can take as many or as few units as you wish. It is perfectly valid to study only one unit to develop a specific area of mathematical knowledge. Each unit is certificated as a qualification in its own right.

To gain the AS in Use of Mathematics, you need to pass two FSMQ advanced units, plus a further unit Applying Mathematics, as shown below.

Units required for AS Use of Mathematics:



2.2 Making Entries and Certificating

To enter for FSMQ, you need only enter for the unit you are taking, e.g. 6981. No extra “cash in” code is required. You can enter advanced units as stand alone FSMQ units and not as part of the AS. To do so, simply enter for the single unit code in the same way, eg 6990.

To enter for AS Use of Mathematics, you must enter for the three units you are taking plus the “cash in” code for the AS, which is 5351.

So the only entry combinations possible in Use of Mathematics are:

$$6991 + 6990 + \text{UOM4} \quad +5351$$

$$6991 + 6992 + \text{UOM4} \quad +5351$$

$$6991 + 6994 + \text{UOM4} \quad +5351$$

A student entered for the AS will receive certificates for all the FSMQ units they pass, regardless of whether they pass the AS overall. So if a student passes 6991 and 6992 but not UOM4, they

will still earn the two FSMQ qualifications but not the AS.

It is not possible to take the assessments for a FSMQ unit one year and certificate in a later year; certification is automatic and is triggered when the components are graded.

Queries on Entries

Our entries department can be contacted by emailing Entries@aqa.org.uk. The telephone number depends where you are located in the country; please see the Contacting AQA booklet on the AQA website for more details.

2.3 Results

Results for all levels of FSMQ are released on the same day as A-level results.

At advanced level only, candidates' raw marks will be converted by AQA to uniform marks, which will be reported to the centre.

Uniform Marks Scale

Uniform marks are used to report candidates' achievements on a standard scale, irrespective of the unit and the examination series in which it was taken. In these specifications, the ranges of uniform marks allocated to each grade are as follows.

A	B	C	D	E	U
100-80	79-70	69-60	59-50	49-40	39-0

For example, an advanced unit is marked out of 60. If the awarding committee that year determines that the lowest mark for grade A is 45, then a candidate with 45 raw marks will receive 80 uniform marks.

The uniform marks for the appropriate three units are added together to give a total uniform mark for the AS Use of Mathematics.

Advanced Subsidiary

A	B	C	D	E	U
300–240	239–210	209–180	179–150	149–120	119–0

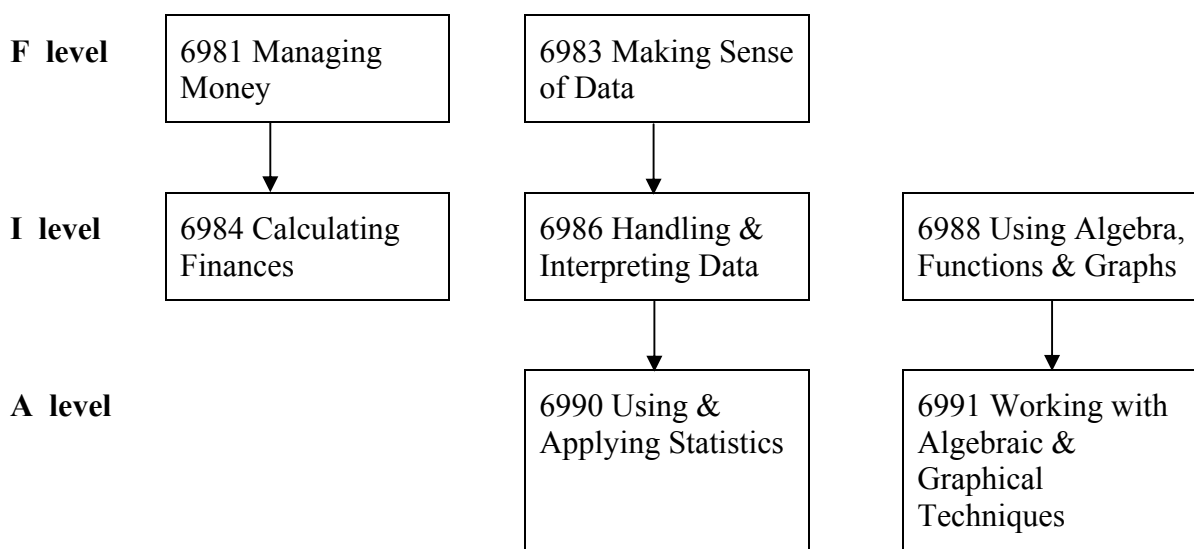
2.4 Key Skills Proxy

A – E grade performance in AS Use of Mathematics provides exemption for the Key Skill in Application of Number at level 3. To obtain the key skills certificate, you need to make an additional entry for the Use of Mathematics candidates under a proxy code

To obtain the Application of Number level 3 certificate for an AS Use of Maths certificated in a previous series, the proxy code is 8933. To enter for the Application of Number level 3 certificate in the same series as the AS Use of Maths, the proxy code is 8939.

So, for example, a candidate taking the two compulsory units plus the statistics option and wanting both the key skills and AS certificates would enter: 6991, 6990, UOM4, 5351, 8939.

- 2.5 Can I enter units at more than one level? You can enter any combination of FSMQ units. For example, a student could take Making Sense of Data, 6983, at foundation level at the same time as Calculating Finances, 6984, which is an intermediate level unit.
- 2.6 Is there progression between levels? There is some natural progression between levels, where similar areas of mathematics are studied at differing levels of demand. This is shown in the diagram below.



- 2.7 Teaching the same topic at two different levels The Chief Examiner has this to say on the subject of progression between levels.

Candidates are required to *use appropriate mathematics*, which means that the mathematical technique used must be appropriate to the task undertaken. It is also a requirement that, for the portfolio as a whole, the mathematics used should reflect the level of the unit.

For example, consider the data units, 6983, 6986 and 6990. The foundation unit 6983, Making Sense of Data, contains within its specification pie charts, bar graphs, pictograms and scatter diagrams, together with numerical values such as mean, median and mode. It is probable that when students study the intermediate unit 6986, Handling and Interpreting Data, it would be found appropriate to include a significant proportion of these techniques in their portfolios. However, if the portfolio is to be worthy of more than a bare pass at intermediate level, the portfolio would also need to include some of those topics listed in the intermediate specification which were **not** within the foundation unit. Such topics include cumulative frequency diagrams, histograms with uneven intervals, weighted means and comparative pie charts. For a portfolio to be worthy of a high mark of over thirty five marks (out of fifty one), it would be necessary for a significant proportion of the portfolio to demonstrate those techniques used only in the intermediate unit. Naturally, the task requirements of the

specification must also be considered, so that, for example, the intermediate level portfolio for 6986 will also include a report that critically examines a piece of work produced by others based on at least three statistical measures and/or diagrams.

The same requirement to use appropriate mathematics is to be considered when portfolios are submitted for the advanced level units. For example, 6990, Using and Applying Statistics must contain mathematics which is not included within the intermediate level unit. Cumulative frequency diagrams and histograms with uneven intervals are included in the advanced level unit, and in most AS statistics units. Nevertheless, the advanced portfolio should also include normal distribution in addition to the one (or more) of the extension opportunities which has been chosen by the candidate.

The principle described for the data units above should also be incorporated in all other units. Thus, for example, portfolios produced as part of the advanced unit 6991, Working with Algebraic and Graphical Techniques, must include techniques which were not included in the intermediate unit 6988, Using Algebra, Functions and Graphs. When a student starts work on the advanced unit, 6991, it is extremely likely that the initial work and the initial investigation will include work on modelling which could well have been included in an intermediate portfolio. However, the portfolio must include a task involving post-intermediate level work. Again, portfolios which are worthy of a high mark would involve a greater amount of post-intermediate work together with more mathematically challenging topics such as exponential and logarithmic work.

In the finance units, 6981 and 6984, the need to take care over the use of appropriate mathematics is not so paramount. This is because the intermediate unit, 6984, Calculating Finances, specifies tasks to be included, such as income tax and national insurance, which are not included in the foundation unit, 6981, Managing Money. Again, the details required for the task on keeping a record and analysis of an account differ substantially between the foundation and intermediate levels.

2.8 Examinations

There are two examination sessions a year. The dates and times of the examinations are inter-board slots fixed by QCA; AQA cannot alter them.

Units 6981, 6983, 6984 and 6986 are available in both January and June series.

Units 6982, 6988, 6990, 6991, 6992, 6994, UOM4/1 and UOM4/2 are all available in the June series only.

Coursework deadlines are 10 January in the January series and 15 May in the June series.

Candidates submit the coursework portfolio and sit the written paper in the same examination series. A candidate who submits the portfolio but is absent for, or wishes to re-sit, the written paper can carry forward the portfolio mark to a later examination series. A candidate who wishes to resubmit the portfolio may **not** carry forward the written paper mark; the paper must be re-taken as well.

2.9 Use of ICT

FSMQ aims to promote appropriate and competent use of ICT, and this is something which many students find appealing over traditional mathematics courses. The unit specification will clarify where ICT is not to be used (e.g. a requirement to draw graphs by hand) and list which ICT skills students must provide evidence for, e.g. spreadsheet use.

As a guide:

6982 and 6994 do not require any computer use, though there are opportunities where students may do so.

6981, 6983, 6984, 6986, and 6990 require calculator and spreadsheet use.

6988, 6991 and 6992 require use of graphics calculators or graph plotting computer software.

Advice to a centre preparing for the full AS Use of Mathematics would be to ensure that candidates are prepared and proficient at using a graphics calculator across all three modules.

Scheme of Assessment

3

External Assessment

3.1 Are the same FSMQ papers set by all boards?

AQA is the only board currently setting papers at foundation and intermediate level FSMQ.

Papers for the advanced level FSMQ and the AS Use of Mathematics are not inter-board, that is to say each awarding body sets its own questions based on the same unit design.

3.2 Are past examination papers available?

Past papers and mark schemes are available to download on the AQA website, www.aqa.org.uk.

However, as FSMQ and Use of Mathematics employ real world data in the questions, it is not always possible to reproduce all the material in electronic form (the owners of the copyright on the information will often grant permission to reproduce it only in printed form).

Where this is the case, the material has been published on our website incomplete (with the copyrighted sections removed). For a single complete printed copy of the paper, please email the subject department at mathematics-gce@aqa.org.uk.

Also available on the AQA website are the Chief Examiner's Reports on the Examinations, which contain the pass rates and grade boundaries for the units in each examination series, together with comments from senior examining staff.

Multiple printed copies of the papers can be ordered from our Publications section (contact details printed in the introduction).

3.3 Preliminary Material

The examination papers in all FSMQ units and one of the Use of Mathematics written papers (UOM4/1) are accompanied by a Data Sheet. Paper UOM4/2 is the only paper which does not have a Data Sheet.

The Data Sheet is a booklet of material upon which many or all of the questions on the written paper will be based. You will be supplied with one per candidate. There are two dates printed on the front. The packets must **not** be opened before the first of these dates, even by the teacher. Between the two printed dates, which are two weeks and one week ahead of the day of the exam, the data sheets should be handed to the candidates for them to familiarise themselves with the data and practice different mathematical techniques using the facts and figures provided.

Data sheets are sent out to centres at the same time as the question papers and are similarly packaged- please double check they are not hidden amongst your packs of question papers before you report

them missing!

An identical copy of the data sheet is included inside every examination paper. The first copy must **not** be taken into the examination; candidates should use the fresh copy provided. Candidates therefore cannot make notes on the data sheet to take into the exam.

3.4 What mathematical equipment is required for the examination?

The usual pen, pencil and ruler, plus a protractor and compasses in some examinations. Students are expected to use calculators. Graphics calculators are permitted and, in UOM4 Applying Mathematics, the use of a graphics calculator is expected.

3.5 Calculators in examinations

Figures from the data sheet may **not** be entered into calculators and taken into the examination. Calculator memories should be cleared before they are brought into the examination room.

Calculators in Use of Mathematics

Although it is only for the Applying Mathematics papers (UoM4/1 and UoM4/2) that a graphics calculator is required, candidates for the units Working with Algebraic & Graphical Techniques (6991) and Modelling with Calculus (6992) will find the use of such a calculator helpful. It is possible that candidates for the unit Using & Applying Statistics (6990) will also find the use of a graphics calculator helpful. However, it is possible for each of the units 6990, 6991 and 6992 to be completed using only a scientific calculator - this has been agreed because, as these units are also FSMQ units, it may be that candidates sitting only one unit will not want to purchase a graphics calculator. Examination papers are written bearing these requirements in mind.

The rules for the use of calculators in any GCE examination are laid out in section 3 of the "Instructions for the conduct of examinations" document on the JCQ website www.jcq.org.uk. Most of this is designed to stop people taking laptops, palmtops, phones etc. into the examination, but centres should be aware of section 3.2.1 which forbids the use of calculators capable of symbolic manipulation. In 2006, this is a very sophisticated facility; however, inevitably, there are increasing numbers of ordinary-looking calculators with such capabilities. The vast majority of calculators are absolutely fine and it is only a very small, elite band of top-of-the-range calculators that cause a problem, including the following models:

Texas Instruments TI 89
Casio Algebra FX 2.0 plus
Casio CFX 9970
Hewlett Packard HP 48gII
Hewlett Packard HP 49g+

Centres should also be aware that the Texas Instruments TI-82 calculator has been found to be unsuitable for 6990, as it does not allow the user to enter frequencies greater than 99.

4

Portfolio

4.1 Does AQA set coursework tasks?

AQA does not set specific coursework tasks. This is so that students can use data and material from other subjects or their own hobbies.

However, the Nuffield Foundation publish example coursework tasks on their website at www.fsmq.org. You can use these tasks unaltered if you wish. Please note that this is **not** an AQA site; Nuffield is an independent educational charity but some of the staff are involved with AQA examining.

Each centre is assigned a coursework adviser, who will give you guidance and answer questions regarding setting appropriate portfolio work. Contact the subject office with your question (mathematics-gce@aqa.org.uk) and it will be passed on to the coursework adviser, who will contact you directly.

The same tasks can be used year on year; you do not need to change the tasks for each year group.

4.2 How much structure can be given in an assignment? Can I provide data for the assignments?

Students must be able to show independence in their work, particularly at higher levels, and over-structuring can deny students the chance to gain these marks. At foundation level, for task 3 of the managing money unit, providing an electricity bill for the class to use is acceptable. At Advanced level, providing one set of data is fine if the students can work on different points from the set. Unit 6990 specifically requires students to work with data they have collected themselves in one of their investigations.

For foundation and intermediate students, independence ranges from completing tasks on their own in the classroom without repeatedly asking for guidance to actually collecting their own data. At advanced level, more evidence of independent work is required so assignments should not be too leading and worksheet-style question and answer tasks are very limiting.

4.3 Can students share assignments?

Students may **not** collaborate on coursework; the portfolio must be the student's own work.

There is no reason why assignments should not be shared between FSMQ and Key Skills, or between different FSMQ units, but in practice it can be difficult to tailor tasks to adequately satisfy the requirements of both.

It is also important that the moderator can easily find the evidence- if it is not logically ordered because it has also been submitted for another subject it is harder for the moderator to appreciate the portfolio's standard.

4.4 Can students use material from other subjects?	This is to be encouraged. FSMQ is meant to support mathematical work in other subjects. Data collected in the students' other studies, e.g. Biology, Psychology, Geography, is ideal for analysis in FSMQ units. The requirements for the candidates' work are laid out in the specification for each unit- check that the data / tasks are appropriate and will allow students to demonstrate the skills described in the specification. (See the following section for ideas.)
Using coursework from other subjects and specifications	<p>FSMQ is well established as a successful course for those students who are motivated by studying mathematics relevant to their lives, rather than as an academic subject with little obvious relevance to the real world. Such students may follow the course as a part of “an enrichment programme” or “life skills course”.</p> <p>FSMQ units are also designed for those students who wish to support the other courses they are pursuing. It is noticeable that the majority of good portfolios are produced by candidates who have a clear involvement in the tasks given. The advantage of using material produced for their main studies is that it helps students appreciate fully the use, relevance and benefit of following the FSMQ course. It also saves students time by preventing them from needlessly repeating coursework similar to that produced for other subjects.</p>
Advanced level	<p>The following section may help to identify sources of possible coursework topics. It is not intended to be a prescriptive list.</p> <p>Whereas tasks involving statistical measures are clearly appropriate for the advanced statistics unit, 6990, tasks involving scientific experiments are more likely to be beneficial for the advanced algebra unit, 6991, and the advanced calculus unit, 6992.</p>
6990 Using and Applying Statistics	<p>The following section may assist teachers and lecturers in finding examples of tasks which can be included within portfolios for 6990 Using and Applying Statistics.</p> <p>Geographers frequently return from fieldwork with an enormous quantity of data which lends itself very readily to this unit. For example, the size of pebbles on the beach and their distance from high tide mark could well form the basis of a correlation task. An investigation into the shopping facilities in two villages could be the basis of Chi-Square or Whitney Mann tests.</p> <p>Work undertaken in vocational studies could also form the basis for statistical investigation. Thus, a Health and Social Care student investigating the age and size of children could study the correlation between weight and head size, or height and length of index finger. The use of material studied in economics or business studies also lends itself to a variety of statistical work.</p> <p>Since most portfolios for 6990 should include the use of the normal distribution, it is desirable that teachers and lecturers try to ensure the students have an opportunity to produce work on a normal distribution.</p>

Contexts which readily lend themselves to use of the normal distribution include:

- ◆ the number of visitors to an art exhibition (Art and Design)
- ◆ the weight and dimensions of a child (Biology)
- ◆ a study on the work of trading standards staff on the weight of the contents of a jar of jam or a packet of biscuits (Business Studies)
- ◆ the daily change in the value of a share (Economics),
- ◆ the number of patients registered with a doctor (Health and Social Care)
- ◆ the time spent on the internet by students (Information Technology)
- ◆ the prices people pay for package holidays (Travel and Tourism)

6991 Working with Algebraic & Graphical Techniques

For Working with Algebraic and Graphical Techniques, 6991, suitable work from experiments in physics could include:

- ◆ the length of a simple pendulum and its time of oscillation
- ◆ Ohms law, measuring current against resistance for a constant voltage
- ◆ Boyle's Law, investigating pressure against volume
- ◆ time taken, against distance, for a ball to roll down a slope
- ◆ time taken, against distance, for a ball to drop through a viscous liquid.

Similar work could be developed from chemistry or biology. Experiments involving bacterial growth or radioactive decay could form the basis mathematically for exponential and logarithmic work.

In Economics or Business Studies, the value of an amount of money invested after a period of years could be studied as the basis of exponential or logarithmic work.

Similar experimental work can be obtained from other vocational courses, for example:

- ◆ the growth in the population over 60
- ◆ the growth in the number of people with cancer
- ◆ the income generated by a restaurant
- ◆ the growth in the production of goods by a company.

6992 Modelling with Calculus

For Modelling with Calculus, 6992, the data found **must** have a practical purpose. For instance, the euros obtained at a variety of exchange bureaux compared with the amount of money in pounds sterling being changed will create a graph. Finding the area under this graph is clearly meaningless.

All the suggestions for rates of growth listed for the advanced

algebra module could also be used as the basis of work on differential equations for unit 6992. If one specific study is to be used for units 6991 and 6992, it is essential that the study is capable of satisfying **all** the specification requirements for both units. The study will then be assessed separately for each of the two units.

Foundation and intermediate level portfolios

Managing Money, 6981, which is basically the study of real life Mathematics can incorporate work from a variety of different sources. Students following AVCE, BTEC National or BTEC First courses can all use data from their courses.

For example

for the Best Buy:

- ◆ where does an actor buy his stage make-up (Performing Arts)

for the order form:

- ◆ write an order for stationery for a small office (Business and Finance)

for the bank statement:

- ◆ collecting money for a trip (Travel and Tourism)
- ◆ running a residential home (Health and Social Care)
- ◆ planning and selling tickets for a show (Performing Arts).

In all the cases suggested above, the use of data from other courses will save the candidate from collating more data.

Part of the coursework for Making Sense of Data, 6983, could be obtained from the GCSE Mathematics MA4 handling data task. However, the MA1 investigative task does not readily lend itself to become part of an FSMQ portfolio.

Much of the work produced for 'key skills' can also be used in their FSMQ portfolio.

As examples, students following vocational courses could include as a basis for portfolios for 6983 or 6986:

Health and Social Care

- ◆ the number of times a group of pensioners go shopping each week
- ◆ the number of phone calls they receive
- ◆ the number of patients seen by a GP, health visitor or nurse in one day

Travel and Tourism

- ◆ the number of visitors to a theme park
- ◆ the amount spent by visitors to a theme park
- ◆ the number of flights taken in a year

Business and Finance

- ◆ the number of photocopies made in an office in a day
- ◆ the number of phone calls received by an office in a day

Public Service

- ◆ the number of police on duty at a football match
- ◆ the time spent fighting a fire in a daily shift

Performing Arts

- ◆ the number of people at a theatre
- ◆ the number of films watched in a month by students.

Clearly it is desirable that the topic studied by the student is, if possible, the topic on which the vocational group have found the data.

4.5 Candidate Record Forms

Each portfolio must have a Candidate Record Form attached, and the form must be signed off by both the candidate and their teacher.

Extra candidate record forms are available on the AQA website (email mathematics-gce@aqa.org.uk for the current link if you can't find them).

AQA requires teachers marking coursework to “show clearly how credit has been assigned in relation to the criteria defined in the specification”. This is to satisfy QCA (section 5.13 QCA Code of Practice) and it also helps the moderator support your marking if he/she can see why you have awarded the marks you have. The spaces on back of the candidate record form are provided for your comments, and for you to indicate anything to which you feel the moderator's attention should be drawn.

4.6 Administration

The procedures for submission of coursework are detailed in the booklet “Examinations Officer Instructions Centre-Assessed Work” code CAW/EO/INST(GCE) if you need to check anything. Your exams officer should have a copy.

Coursework deadlines are 10 January in the January series and 15 May in the June series. Please bear in mind that to submit coursework marks by January 10, the work will probably need to be completed before the Christmas break.

It is acceptable for work moderated in the January series to be handed back for the student to improve, then to be submitted again in the June series where the student is re-sitting the exam. Similarly work can be marked by the class teacher, handed back with comments for students to think about and marked again in an improved form.

4.7 Incomplete portfolios

Candidates who have not completed every task listed in the specification may still submit their portfolios, but the marks will be penalised.

4.8 How will I know how to mark the coursework?

New centres **must** send a representative to a Coursework Standardising Meeting the first year they run the specification. At this meeting you will be shown exemplar coursework and guided through the marking criteria by a senior moderator. Most concerns are satisfied after attending the meeting. The representative should then ensure any other staff marking the work are trained to mark the same way within the centre.

Dates are published on the AQA website when the venues are booked- check here for details:

http://www.aqa.org.uk/qual/fsmq/foundation_not.html

http://www.aqa.org.uk/qual/fsmq/intermediate_not.html

http://www.aqa.org.uk/qual/fsmq/advanced_not.html

You will need to attend the session appropriate to the level you are teaching. Because the meetings begin in the Autumn term, before estimated entries are processed, it is not possible to contact new centres directly (the subject department will not know in time who the new centres are).

Centres whose marking was out of tolerance in the previous session will also be required to send a representative.

Older exemplar coursework may be available from the subject office.

4.9 Introduction to marking portfolios

A quick introduction to marking portfolios follows; obviously this is no substitute for attending the coursework standardising meeting but will hopefully serve to familiarise you before the meeting and as a reminder afterwards.

The list of tasks required and the marking grid are both printed in the specification for the unit. The specification also contains guidelines for penalising portfolios which don't include all the tasks required. You'll need these in front of you as you mark.

The marking grid is divided into three strands or themes, ranging from 0 to 17 marks in each strand. So the maximum mark is 51 and the minimum is zero. (Zero is not usually awarded if work has been submitted.) Each strand has description boxes which detail the minimum requirements for a particular mark, which they are connected to on the scale on the left. So, for example, a portfolio containing no major errors is the minimum requirement for awarding 5 marks in the middle strand. These descriptors are 'hurdles'- no mark beyond the hurdle can be accessed if it is not satisfied, even if evidence is present for more difficult marks. So in this example, if major errors are present, the maximum mark you can award in theme two is 4 even if there is evidence of a range of checking, which is the next hurdle.

1 Are all the required tasks present in the portfolio?

Scaling guidelines for incomplete portfolios have now been added to the specifications, to clarify how the marking grid deals with candidates who have not submitted the required work. Incomplete portfolios do not automatically gain a mark of zero.

If a task is entirely missing, apply the scaling rules described in the specification. If a piece has been submitted but it is poor or incomplete, you do not need to apply the scaling rules but the work will only make a weak contribution to the portfolio.

2 Choose the best half of the portfolio, and only use this half to gauge the overall standard of the portfolio (to take into account progression throughout the course). Measure each strand against the same half of the work, however; you can't pick the best half for each strand.

3 Roughly speaking: 14 on each strand is for A grade work; this is achievable but must be work of a creditable standard. A mark of 3 – 4 in each strand produces a bare pass. About 8 in each strand is a C grade portfolio. Remember that portfolios submitted at advanced level should be AS standard work.

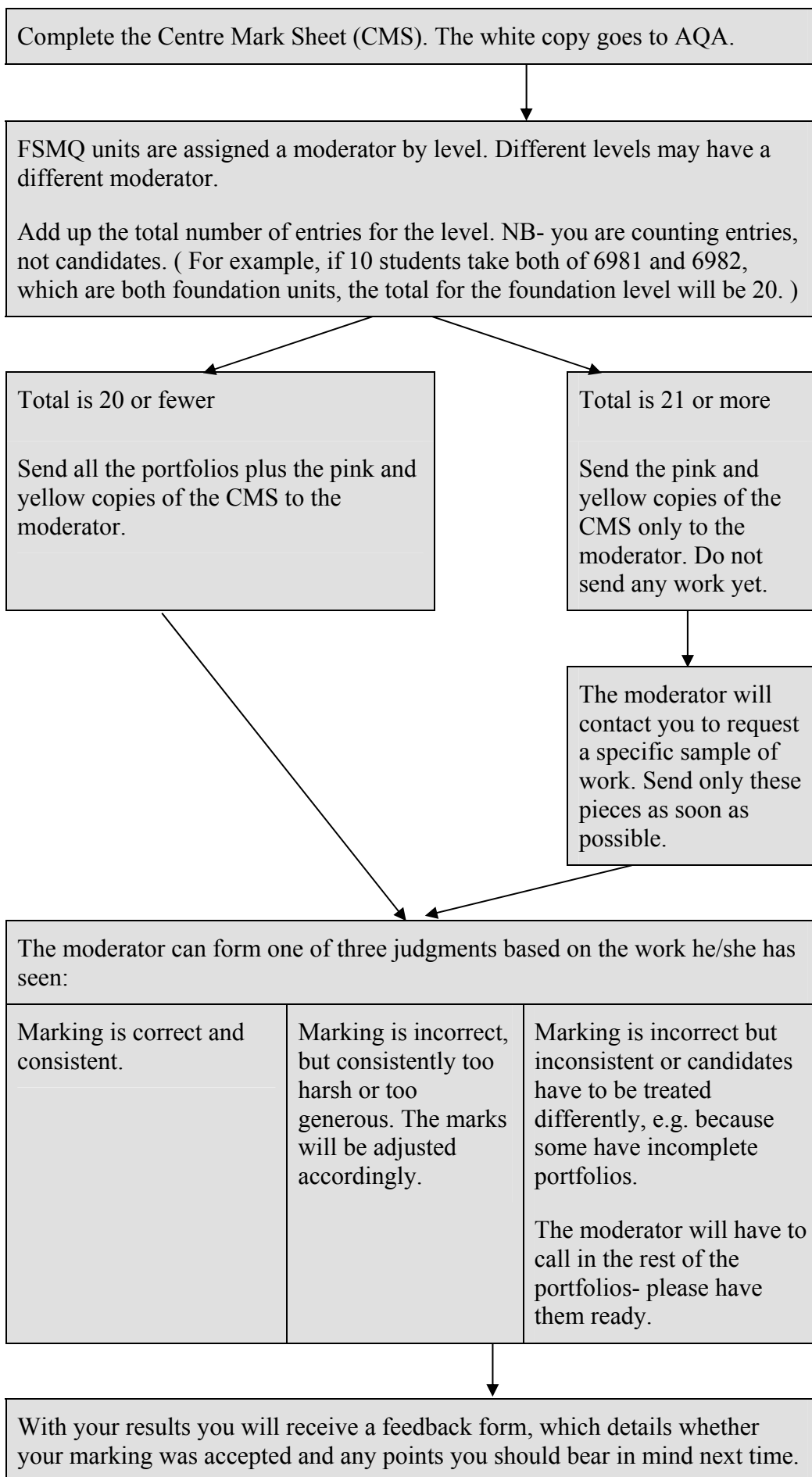
4 Look at the description hurdles on each strand and find the first hurdle the portfolio doesn't satisfy and the last one below it that the work does satisfy. The marks which the description boxes are level with then give you a range of marks which the piece falls into. For example in strand 1, if the student did not work independently but produced an easy to follow portfolio, your range is 5 to 8 (the hurdle at 9 is not satisfied but the one at 5 is). If the structure and presentation are good and the reporting is clear, go towards a mark of 8; if it's not great or bits are missing, lean more towards 5.

5 Note that strand 2 requires checking- not just repeating the calculation or totalling longhand as well as by calculator, but comparing the answers to the situation to see if the result is sensible. Without evidence of checking, students can't get above an 8 in theme 2; for a mark of 12-13 in this strand, the student needs to have stated explicitly in the work what they've done as a check.

Evidence of checking can be present in any of the pieces to satisfy this hurdle, not just in the best half of the work, though for a good mark you'd expect it to be present in all pieces.

4.10 The moderation process

Some tasks will be performed by the class teacher and some by the exams officer, but this is a brief overview of the whole moderation process:



5

Frequently Asked Questions and Notes, by Unit

5.1 6981 Managing Money

Marking portfolios: strand 3

At foundation level, all interpretation will be limited. At grade A (around 13+ on strand 3) one would expect good conclusions- for example on interest rates, comments such as “the higher the interest rate, the higher the interest” is not grade A. Comments such as “3% annual compound interest paid monthly is better than 3% annual compound interest paid once a year” supported by calculations is well worthy of grade A. The specification statement “use mathematics to summarise and draw appropriate conclusions” is meant to be an indication of the work required.

"Best Buy" assignment

If a candidate confuses the meanings of excluding and including VAT, this counts as a major error.

It is preferable for a student to remove a major error but, as this assignment is completed early in the course, it is unlikely it will be part of the “better half” of the portfolio which is ultimately assessed.

Students finding their own information from supermarkets and performing calculations based on it are showing independent work.

Evidence of checking in coursework

Where students use totals to check for transcribing errors, there should be a comment by the student to this effect. It is essential, for a high mark in theme 2 to be awarded, that the candidates expressly state where and how checks are made.

Task 4 (Interest)- what do students have to do?

Students need, for example, to find the total amount when £2000 is invested at 5% per year (simple interest) for 2 years, and £2000 at compound interest of 5% per year for 2 years, together with a comment on the results.

Order form task

Allowing the students to choose the order rather than giving them a pre-determined order will help them access marks for independent work.

"Firemen's Pay" task

“Firemen’s Pay” is a task on the Nuffield Foundation website (www.fsmq.org). This task is easily at the top end of the syllabus content. Compound percentages / fraction-and-percentages are above the level required for a foundation course; it would not be surprising if foundation students struggled with this task.

5.2 6982 Working in 2 and 3 Dimensions

Elevation of a 2 or 3 dimensional situation

The expectation is that students will be given an accurate plan or elevation from which they will produce a realistic sketch, not the other way round.

Solutions to problems with 5 readings	It is expected that the students will take the five readings in one situation; if this is not realistic, you would need four in each of two situations.
5.3 6983 Making Sense of Data	
Can GCSE Mathematics A04 coursework be used as part of the 6983 portfolio?	You can use one piece of work for both GCSE and FSMQ; either can be a photocopy. However, you must assess both qualifications under their own criteria. You may find that, depending on the task and the expected grade achievable, you will need to add certain diagrams and analyses as appropriate. For example, at GCSE AO4 you must include a hypothesis; for 6983 you must include analysis of work done by someone else (often a newspaper article).
Two tables from two different situations	This simply means two different sets of results; it does not require them to be primary and secondary or discrete and continuous data. The assumption is that one of the tasks will be considered using spreadsheets whereas the other could be considered using tables, diagrams etc. drawn by hand.
Number of tasks	There is no correct way to set out the portfolios as long as the requirements of the portfolio are complete. The criteria can be all contained in one or two assignments, or covered in six tasks. Nor does it matter if two teachers at the centre have used two different approaches in this respect.
Are spreadsheet formulae required in the portfolio?	Candidates will not be penalised for not including a spreadsheet formula. This will only matter to potential A grade candidates who will need to include it to access the top marks.
5.4 6984 Calculating Finances	
Must candidates include all rates of tax when they study income tax?	At least one of the three calculations of taxed pay must include all relevant rates of income tax.
5.5 6986 Handling & Interpreting Data	
Critically examining the work of others	<p>Typically, work on which the critical report can be based comes from newspapers and magazines, the internet or government / local authority publicity material. It could also come from other subjects, or in extreme cases, from another teacher's work.</p> <p>The material does not have to be highly academic, for example "Speed cameras prevent accidents (within 100 yards of the camera) but do not prevent accidents (within ½ a mile of the camera)" could form the basis of criticism on an article for or against the use of cameras.</p>

5.6 6988 Using Algebra, Functions and Graphs

Can only one report satisfy the portfolio requirements?

The specification states, “It is possible, by judicious selection of a data set, that just one report could satisfy all of the content demands of the qualification, but this would not necessarily allow candidates to develop their understanding of how the language of functions, graphs and algebra allows one to understand and describe different situations. Therefore two *or more* situations must be investigated and reported.”

This passage has been considered ambiguous by a few teachers and requires clarification. One report is **not** sufficient and more than one report **must** be undertaken.

5.7 6990 Using & Applying Statistics

Extension material

The extension material attempted will limit the grade attainable. Spearman’s rank correlation co-efficient is not a sufficiently difficult topic to access grade A, even if executed well.

What is “raw data”?

Raw data can be obtained from other departments at the centre (e.g. Biology, Geography) or as non-processed data from the internet. You should not use only processed data- i.e. data which has been grouped, modified etc. It does not have to be primary data as long as it is unprocessed.

The Nuffield Foundation website (www.fsmq.org) contains a lot of data in its original, or spreadsheet, form.

How much of the portfolio needs to be ICT based?

The minimum requirement is that students have used a spreadsheet to calculate with data and develop diagrammatic representations. This spreadsheet use must be included in the portfolio, and must be a computer spreadsheet: a calculator will not suffice. The rest of the work may be completed without using information or computer technology.

Where much of the work is completed by spreadsheet, checks and some interpretation are required to show that candidates have understood what they have done.

Portfolio task 1

The specification states “You should: use only appropriate statistical measures, diagrams and techniques (including probability models and ideas of correlation).” Probability models and ideas of correlation are listed as topics which *could* be included, but they are not required.

Percentages in 6990 written papers

Although they are not specifically referred to in the specification, questions involving percentage calculations and percentage change have appeared so regularly in past examination papers for this unit that they are now considered required knowledge.

Language	If a candidate writes “the mean is” where they should have written “the estimate of the mean is”, this is acceptable- FSMQ is a support subject so language comprehensible to someone working in another subject area is sufficient (as opposed to the wording expected of a pure statistician).
Will Spearman's rank correlation coefficient be tested in the exam?	Spearman’s rank correlation coefficient is an extension opportunity and the study of this topic is not a requirement of the specification. As such, it will not be examined in the written paper and the formula has consequently been removed from the formula booklet. The product moment correlation coefficient is still examinable and remains in the formula booklet.

5.8 6991 Working with Algebraic & Graphical Techniques

How much guidance can be given? Do candidates need to think up their own tasks?	For grade A work, students would be expected to gather most of the data themselves. The tasks can be given to the group and this would not prejudice their grades.
Is six readings sufficient data to work with?	Modelling six points with a straight line is acceptable for the first piece of coursework. Naturally, over the portfolio as a whole, the student would be working on a model using more than just six points.
Use algebraic techniques to solve problems for an exponential model (task 1c)	If a student finds data which turns out to be a power graph rather than an exponential graph, this is fine for this task; either can be used.
Portfolio task 2- “fit a function to non-linear data using logarithmic or other techniques”	Use of a trigonometric function (eg sine wave) or a quadratic would satisfy this requirement in terms of submitting a complete portfolio, but to access a grade A candidates must include logarithms or exponentials.

5.9 6992 Modelling with Calculus

Can the same piece of work be submitted to count for both 6992 and 6991?	The same work can be submitted for both units, provided it satisfies the requirements of each unit individually. Please remember that 6992 has many specific requirements relating to calculus which would need to be included.
How far can work be pooled before it limits access to higher grades?	If many students have performed an experiment, e.g. in Physics, they can all count this as an original investigation- naturally though, their working etc. should be independent work. Please remember that for top grades work is expected to cover all the specification, including differential equations and logarithmic / trigonometric / exponential work.
Suggestions for AS level work providing the right opportunities for 6992 coursework	Work involving integration / numerical integration could be found, for example, in: the amount of a drug in a patient’s body (Ae^{-kt}), the amount of bacteria (Ae^{kt}) from Biology, or the average price of a share from Economics. In Geography, modelling of slopes (cross sections) could produce equations to differentiate.

	<p>Are contexts from GCSE Science appropriate where a centre does not teach A level?</p>	<p>Contexts from GCSE Science are fine, as long as the work produced is on the use of calculus.</p>
	<p>More topics for portfolio tasks</p>	<p>The examination papers are designed to reflect the portfolio. This can be turned around so that topics for the portfolio can be based upon the scenarios given in question papers.</p>
	<p>Differential equations</p>	<p>The portfolio will not be penalised as incomplete without differential equations, but the candidate is unlikely to achieve a higher grade than a C without including them.</p>
5.10	<p>6994 Using & Applying Decision Mathematics</p>	<p>See page 31 of this teachers' guide.</p>
5.11	<p>UOM4 Applying Mathematics</p>	<p>Ensure that you cover the whole syllabus for UOM4 including recurrence relations and simulation techniques.</p>

Course Organisation

6

Delivery of the Course

- 6.1 Schemes of work
- AQA has not created any schemes of work for FSMQ units but the Nuffield Foundation have published suggested schemes of work for every unit, including UOM4 Applying Mathematics, on their website www.fsmq.org.
- The detailed subject content listed in the specifications is the maximum that the examiner can require of students. Past examination papers should also be considered, as there is precedent to continue examining skills which have been regularly tested in the same paper in previous years. Textbooks are not a definitive guide to what may be examined.
- 6.2 Assumed knowledge
- Section 4 of the specification lists the knowledge required before you begin to study each unit.
- There is no assumed knowledge in Foundation level units.
- 6.3 Teaching time
- Each unit, irrespective of level, is designed to require 60 hours guided learning time. Portfolios require an additional 12 hours work.
- 6.4 Using portfolio work to teach the course
- Portfolio work does not have to be assignments set to students at the end of the topics in addition to the work they complete during the course. Exercises completed during teaching can form part of the portfolio. For example, once a topic has been explained, you might normally give the students two exercises to practice the technique. After the first exercise, when you've marked it and checked the students are using the technique correctly, the second exercise can be a task for the portfolio. Only the best half of the work will contribute to the assessment of its standard, so early assignments need not be perfect. (Note, however, that using prescribed, worksheet style tasks can severely limit the students' marks for independent work.)
- Coursework – the work of the course
- The chair of examiners has provided this example.
- Pros and Cons
- Ideally, candidates' portfolios can be seen as tools for teaching rather than as an extra burden on top of the course.
- One important advantage of this approach is that many candidates are especially well motivated to listen and think carefully during "coursework lessons" because they are perceived as being directly relevant to achieving a good grade. However, a potentially serious problem is that candidates may be led into writing up their coursework at a time when relevant topics have not been fully understood or may even have been misunderstood.

For example, in the unit *Using and Applying Decision Mathematics*

The algorithmic approach to most decision mathematics topics (together with relatively straightforward algebraic prerequisites) tends to minimise candidates' initial conceptual difficulties. This unit is therefore a promising one for enabling the teacher to use coursework as a teaching tool.

Selecting a topic

Most Decision Mathematics topics are appropriate for coursework tasks. However if a teacher is intending to use coursework to motivate candidates' work during the course, then it might be best to pick an area before starting to teach the unit. The lessons for that area can then be specially planned to facilitate such an approach. The consequent variation in teaching style may well then have pedagogic advantage in its own right.

Teaching Critical Path Analysis

For the purpose of illustration, the topic of Critical Path Analysis will be described below. Experience has shown that this topic is one which lends itself to relatively realistic coursework tasks.

The teaching of Critical Path Analysis for use as a coursework project can usefully be split up into the following topic areas.

- ◆ Drawing a precedence table and activity network.
- ◆ Calculating the earliest start times.
- ◆ Calculating the latest start times.
- ◆ Identifying critical activities and considering resources.

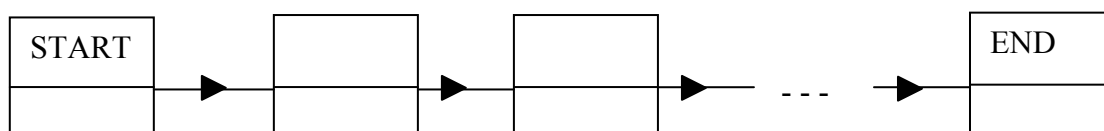
After the teaching of each one of these stages, candidates can reasonably be expected to successfully carry out the relevant work for their own coursework task. After all four stages have been completed, candidates can consider the significance of their analysis for the real world activity and can complete the modelling process.

Experience does show that this can work very well, *providing* steps are taken to ensure that a candidate does not end up with such a simple network that the exercise provides little meaningful information about the real world activity being described.

Two potential problems are that :

- ◆ the network is virtually linear,
- ◆ one resource is so limited as to overly constrain the solution.

The first of these problems can be prevented by checking each candidate's initial project ideas to ensure that an activity network will be produced which is **not** simply a line of activities:



It is essential that some activities can take place simultaneously so that the activity network will be worthy of detailed mathematical analysis.

The second problem may be more difficult to spot but, fortunately, it can usually be solved by insisting that the candidate relaxes the constraint to admit a more involved analysis.

An example

Consider the task of customising a car in some way. This will be a genuine task for some candidates but they may wish to analyse it with themselves doing **all** the work. Unfortunately they will then end up with a solution in which the activities have simply to take place one after the other.

However the basic idea of this project is an excellent one and good coursework can result by means, for example, of having some tasks done by a commercial garage or by having helper(s) of varied technical expertise. In this way, it is possible to produce a sufficiently complicated solution to merit the mathematical analysis and to amply illustrate the relationships between the mathematical model and reality.

6.5 Using the marking grid with students

There is no reason why students should not see the marking grid. They can then evaluate for themselves what they need to add to their portfolios to satisfy the criteria. Students could also be assigned to mark the work of another student, and argue for or against their mark using the criteria. This would illustrate the targets they have been set and their progress so far, and also help the teacher come to a better understanding of any parts of the grid of which he or she is unsure.

6.6 Key Skills IT

It has been suggested by one centre that teaching FSMQ can be combined with teaching Key Skills IT, provided teachers begin collecting evidence early.

7

Support Material

- 7.1 Nuffield Foundation**
- The Nuffield Foundation is an independent educational charity involved with the original development of FSMQ. Their website can be found at www.fsmq.org.
- The resources section of the site features portfolio assignments and schemes of work for all units.
- 7.2 Textbooks**
- These books are not officially endorsed by AQA but in each case the authors include writers who also work for AQA as senior examiners. AQA is not involved in the writing or publication of any of these books, and any queries regarding them will be better directed to the publishers. AQA has no influence in their production or release.
- There may be items in the specification not included in the textbooks, so take care to cover all points listed in the specification rather than simply going through the book; the specification is the definitive list of what the paper setters can examine.
- Textbook for Data units**
- This text covers both Foundation and Intermediate level data handling topics in one book and is designed to support 6983, Making Sense of Data, and 6986, Handling & Interpreting Data.
- ◆ Free-Standing Mathematics Units: DATA
Brian Gaulter & Leslye Buchanan
Oxford ISBN 0-19-914798-1
- Textbook for Finance units**
- This text covers both Foundation and Intermediate level finance topics in one book and is designed to support 6981, Managing Money, and 6984, Calculating Finances.
- ◆ Free-Standing Mathematics Units: FINANCE
Brian Gaulter & Leslye Buchanan
Oxford ISBN 0-19-914797-3
- Textbooks for AS Use of Mathematics**
- For Advanced level and AS Use of Mathematics, the only textbooks the subject office is aware of are those published by Nelson Thornes.
- There are three books-
- ◆ AS Use of Maths: Algebra and Graphs ISBN 0 7487 6976 5
by June Haighton, Anne Haworth, and Geoff Wake
(incorporating the UOM4 Applying Mathematics unit)
 - ◆ AS Use of Maths: Statistics ISBN 0 7487 6980 3
by June Haighton, Anne Haworth, and Geoff Wake
 - ◆ AS Use of Maths: Calculus ISBN 0 7487 6978 1
by June Haighton, Anne Haworth, and Geoff Wake

The publishers' website, for more information, is www.nelsonthornes.com.

One teacher has commented that she found the statistics book hard to use as she found it very wordy, but the subject office has not received any other feedback.

7.3 Contacting other centres

The subject office is often asked whether there is another school or college in the area callers can contact to discuss teaching and implementing FSMQ and Use of Mathematics courses. We are not allowed to release the information because of data protection regulations. However, we are compiling a list of centres who are willing to share contact details so that teachers can collaborate privately on planning their own courses.

If you would like to join the list, so that you can be contacted by other centres and receive a list of centres you can get in touch with, please complete and return the form below (you can photocopy the slip to avoid damaging the book).

FSMQ Centre Contact Directory reply slip

Please return to: FSMQ/GCE Maths, AQA, Stag Hill House, Guildford GU2 7XJ

Centre Number _____ Centre Name _____
 Contact Tel No _____ Contact Name _____
 Contact email _____
 Closest town to centre _____

Centre is teaching: Foundation FSMQ Intermediate FSMQ
 Advanced FSMQ AS Use of Maths

Number of years you have taught these courses _____

Student type (tick as many as are applicable)

<input type="checkbox"/>	Bright pre-16	<input type="checkbox"/>	Mathematically weak pre-16	<input type="checkbox"/>	Demotivated
<input type="checkbox"/>	School VI Form	<input type="checkbox"/>	Post-16 College	<input type="checkbox"/>	Adult education
<input type="checkbox"/>	Prisoners	<input type="checkbox"/>	Other		

I agree to the release of these details by AQA to other centres who want to discuss FSMQ or AS Use of Mathematics.

Signature _____

A

Appendix A: Changes in 2007 specifications from 2006

Unit	Section	Brief summary of changes
6981	3.5	Changes to Access Arrangements and Special Consideration details
	7.2	Added: dividing a quantity into a given ratio
	7.3	Task 5: “percentage or fractional increases or decreases” becomes “percentage and fractional increases or decreases”
	7.4	Clarification of marking the better half of the portfolio and detail on marking incomplete portfolios
6982	3.5	Changes to Access Arrangements and Special Consideration details
	7.4	Clarification of marking the better half of the portfolio and detail on marking incomplete portfolios
6983	3.5	Changes to Access Arrangements and Special Consideration details
	7.2	Added: using a tally chart, expressing two quantities as a ratio, dividing a quantity into a given ratio
	7.4	Clarification of marking the better half of the portfolio and detail on marking incomplete portfolios
6984	3.5	Changes to Access Arrangements and Special Consideration details
	7.4	Clarification of marking the better half of the portfolio and detail on marking incomplete portfolios
6985		Unit withdrawn
6986	3.5	Changes to Access Arrangements and Special Consideration details
	7.4	Clarification of marking the better half of the portfolio and detail on marking incomplete portfolios
6987		Unit withdrawn
6988	3.5	Changes to Access Arrangements and Special Consideration details
	7.4	Clarification of marking the better half of the portfolio and detail on marking incomplete portfolios
6990	3.5	Changes to Access Arrangements and Special Consideration details
	6.3	Spearman’s rank correlation coefficient equation removed from Formula booklet. This topic is not tested in the examination, though it may be included

		in the portfolio.
	7.4	Clarification of marking the better half of the portfolio and detail on marking incomplete portfolios
6991	3.5	Changes to Access Arrangements and Special Consideration details
	7.4	Clarification of marking the better half of the portfolio and detail on marking incomplete portfolios
6992	3.5	Changes to Access Arrangements and Special Consideration details
	7.4	Clarification of marking the better half of the portfolio and detail on marking incomplete portfolios
6994		New unit now available.
5351 AS Use of Mathematics		Additional pathway to AS (due to addition of new decision mathematics unit)
	3.5	Changes to Access Arrangements and Special Consideration details
	8.2	Movement of notation and argument marks from paper 1 to paper 2