NUMERACY ▸ THROUGH ▸ PROBLEM ▸ SOLVING

Plan a Trip

**Shell Centre for Mathematical Education**

Joint Matriculation Board

TEACHER'S GUIDE

Plan a Trip
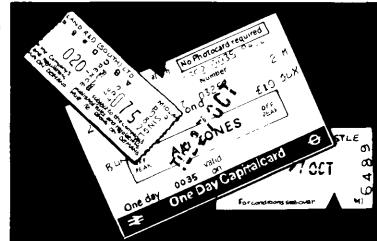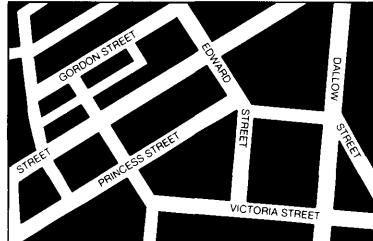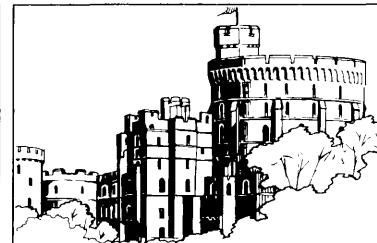
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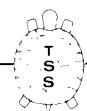
TEACHER'S GUIDE

About this scheme . . .

This scheme for the teaching, learning and assessment of numeracy through problem solving consists of a series of modules which provide effective support for teachers of mathematics who wish to introduce into the curriculum a component which enables their students to link their mathematics to the real world in which they live.

It has been developed with students of all abilities in the age range 13–16, and their teachers.

Each module package provides comprehensive materials for both teaching and assessment, related to a practical context which has proved interesting and enjoyable to the students who have taken part in its development. It is accessible to those who normally find mathematics difficult, while at the same time it provides a challenge for the most able.

A Scheme of Assessment based on these modules is offered by the Joint Matriculation Board. It includes both coursework and examination components of the kind illustrated in this book. Successful candidates receive a Statement of Achievement on each module at Basic, Standard or Extension level and, subject to certain conditions, the JMB Certificate of Numeracy through Problem Solving.

The Scheme relates to the GCSE National Criteria in Mathematics.

Contents

This chapter contains detailed suggestions and hints on the use of the module in the classroom. It begins with information about preparation, including lists of equipment needed. It then gives a detailed commentary, with teaching suggestions, on the Student's Booklet. Some suggested assessment tasks are also included at the end of each stage.

This chapter looks in more detail at various ways of making use of the mathematical opportunities offered by the module. A collection of sample teaching materials is offered.

This chapter contains a discussion of assessment issues, and offers examples of assessment tasks at different levels of difficulty.

Please note:

Throughout this book, all references prefixed with the letter T refer to pages in the Teacher's Guide, references prefixed M refer to the Masters for Photocopying and unprefixed references refer to the Student's Booklet.

Authors

This series of module packages has been developed, as part of a joint project on the assessment of numeracy by the Shell Centre and the Joint Matriculation Board. Many teachers and their students have worked with the central team: Alan Bell, Hugh Burkhardt, Rosemary Fraser, Kevin Mansell, Jim Ridgway and Malcolm Swan together with Barbara Binns and John Gillespie who, assisted by Clare Trott, coordinated the project. Building on previous discussions involving the Shell Centre and the JMB, it was conceived and directed as part of the Testing Strategic Skills programme, by

Hugh Burkhardt

This module, Plan a Trip, has been written by

Malcolm Swan, Barbara Binns and John Gillespie

It is a result of successive revision through five versions on evidence collected from the comments and suggestions of the teachers and students involved, and through classroom observation by the team.

The assessment tasks owe much to the advice of John Pitts.

Many contributions to the work of the project have been made by staff and committee members of the Joint Matriculation Board – notably John Mathews, the Chairman of the JMB's Steering Committee and Austin Fearnley, who has played a major role in the organisation of the operational trials.

Among the teachers and others to whom we are particularly indebted for the contributions to the early development of the module are Roger Brown, David Cain, Joanne Cooper, Rita Crust, Paul Davison, John Edwards, Mick Fitzgerald, Tansy Hardy, Aidan Harrington, Anne Haworth, Steve Maddern, Sue Marshall, Dorothy Martin, Cath Mottram, Mary Robinson, Norbert Gajda, Bob Smith, Aileen Steven, Glenda Taylor, Margaret Tuck, Trish Tunstall and Dave Wilson.

The later trials involved teachers and students in over 50 schools in many local authorities including Barnsley, Bradford, Bury, Calderdale, Cheshire, Cumbria, Derbyshire, Doncaster, Gateshead, Humberside, Kirklees, Knowsley, Lancashire, Leeds, Leicestershire, Manchester, Newcastle upon Tyne, Northumberland, North Tyneside, North Yorkshire, Nottinghamshire, Rochdale, Rotherham, Salford, Sheffield, Stockport, Sunderland, Tameside, Trafford, Wakefield and Wigan. Consultations with their Mathematics Advisers have made significant contributions to the development of the scheme.

The manuscript was prepared through many revisions by Susan Hatfield, Diane Jackson and Jenny Payne, and the staff of Burgess and Longman.

We are grateful to them all.

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Numeracy through problem solving

Plan a Trip is one of a series of modules that have been designed to encourage a new approach to the teaching and learning of numeracy, understood in the original broad sense[1,2] as

> the ability to deploy mathematical and other skills in tackling problems of concern or situations of interest in everyday life.

There is now a general acceptance that people need to learn to *use* the knowledge and skills they acquire at school, and that this requires a shift in the balance of the curriculum to include more real problem solving. This is particularly important for the mathematics curriculum, because the power of mathematics in helping people tackle real problems more effectively, is not often realised.

The Cockcroft Report says

> 'Most important of all is the need to have sufficient confidence to make effective use of whatever mathematical skill and understanding is possessed, whether this be little or much.' (paragraph 34)

and

> 'Our concern is that those who set out to make their pupils 'numerate' should pay attention to the wider aspects of numeracy and not be content merely to develop the skills of computation.' (paragraph 39)

TVEI and other recent curricular initiatives have similar aims, emphasising that curricula should contain a strong element concerned with the tackling of practical problems relevant to everyday life and work. The assessment criteria for the GCSE emphasise these aspects too. Employers say that they are primarily interested in people who can use their knowledge sensibly and effectively.

A curriculum component of this kind places new demands on teachers; it needs a broader range of teaching strategies than does the traditional mathematics curriculum, with some new roles for both teachers and students. The scheme has been developed to provide an introduction to such work in the classroom that is both effective and enjoyable for those involved.

What are the skills?

The modules are based on practical contexts which have been chosen to allow students of all abilities to develop general problem solving (or *strategic*) skills in areas of activity such as designing and making, planning and organising, and choosing.

These *strategic skills* include:
- understanding general ideas and details
- following instructions precisely
- distinguishing between essential constraints and desirable features
- identifying faults
- correcting faults
- generating and listing possibilities (brainstorming)
- developing a rough plan, including: reviewing the prepared suggestions; reaching and recording agreed decisions; maintaining a broad level of description, avoiding excessive detail; identifying needed information and materials; making estimates of quantity and cost; describing, testing and evaluating the plan
- making the final plan, product and/or detailed instructions with comprehensiveness, accuracy, clarity and quality
- implementing the activity with full preparation
- testing and evaluating the plan or product comprehensively.

Various *tactical skills*, more specific to each context, are involved in implementing these strategies; for example, different ways of collecting and recording information are appropriate if you are considering alternative products to buy, or alternative routes to follow.

Technical skills are, of course, required to carry through the solution of problems using the higher level skills described above. Technique is only useful for these purposes in so far as it is *reliable*. This implies much higher standards in this respect than are expected in the traditional curriculum, with a greater emphasis on thorough understanding and checking of whatever techniques are used.

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[1] 15–18 A report of the Central Advisory Council for Education (England). HMSO, 1959.
[2] Mathematics counts. Report of the Committee of Enquiry into the Teaching of Mathematics in Schools under the chairmanship of Dr W H Cockcroft, HMSO, 1982.

Among the mathematical techniques and concepts, of importance in this scheme, are:

- the ability to
  - carry through simple calculations with suitable accuracy, using a calculator where appropriate
  - make estimates
  - make measurements (including number, length and time)
  - draw accurately
  - interpret and display data in a variety of representations (including graphs, maps, timetables and other tables).
- understanding and using some techniques of
  - probability and statistics
  - ratio and proportion
  - geometry in two and three dimensions.
- logical reasoning, including the ability to enumerate alternative possibilities and classify them in various ways.
- research skills, including the collection and evaluation of relevant data.

The relevant mathematical skills are discussed in more detail in each module package. There is also opportunity for the use of other parts of the mathematics curriculum which a student has mastered.

In addition skills from other curriculum areas, such as language and arts, are inevitably called upon, as these are necessary for the presentation of the reasoned arguments which are essential for real problem solving. Since group work is involved, social skills also play their part. Thus, though numeracy is focussed on the deployment of mathematical skills and reasoning in real problem solving, it has a broad cross-curricular aspect.

What is provided?

The scheme is implemented in a modular form, each module being designed to occupy between 10 and 20 hours of teaching time spread over 3 to 6 weeks. Five modules will be available in the first instance. A feature of each module is the importance attached to students working in groups, explaining their ideas and listening to each other, making their own decisions and living with the consequences, reflecting on their experience and learning from it, just as they do in life outside the classroom. While working through the modules, students themselves become responsible for setting and tackling their own problems, rather than simply responding to tasks set by the teacher. Modules are not necessarily staged nor are they dependent upon each other but the sequence which follows is recommended as providing an appropriate progression and a balance of different kinds of context.

The modules in the series are:

- **Design a Board Game:** in which students design and produce a board game which can be played and evaluated by other members of the class.
- **Produce a Quiz Show:** in which students devise, schedule, run and evaluate their own classroom quiz.
- **Plan a Trip:** in which students plan and undertake one or more class trips, and possibly some small group trips.
- **Be a Paper Engineer:** in which students design, make and evaluate 3-dimensional paper products, such as pop-up cards, envelopes and gift boxes.
- **Be a Shrewd Chooser:** in which students research and provide expert consumer advice for clients in their class.

Many contexts were considered and tried in the early stages of development, to see which led to the best balance of classroom activities and learned skills. Those that were chosen all have a practical outcome, interesting and relevant to the students' present circumstances. This corresponds with our observation that people best develop the strategic skills of numeracy in the course of solving problems which they see as realistic, stimulating and within their capabilities. The themes selected were found to have general appeal and to require the use of a wide range of skills, whilst not making unreasonable demands on classroom or school organisation.

Discussion with students and observation in the classroom support the expectation that students' problem-solving abilities improve as they work through the series of modules and that skills acquired in one area are subsequently applied in others. Students themselves maintain that they will be able to apply these strategic skills with advantage in tackling further problems as they arise in their lives outside the classroom. Groups of students also suggested many other interesting and worthwhile themes, each of which could form the basis for a further module. These include: planning and running a jumble sale; raising money for charity by sponsored events; planning and running a magazine; setting up a small business; planning a party; designing a bedroom; planning a youth group weekend; making a garden; orienteering; designing and marketing T-shirts.

The scheme provides classroom materials and assessment tasks, together with further support materials to help teachers explore in greater depth the issues and teaching strategies involved. Suggestions for further mathematical development are also included.

Classroom materials, including detailed teaching suggestions, have been developed to offer a proven approach that has worked well for a representative group of teachers, new to this kind of work, without imposing on them excessive demands of design or implementation. We recognise that, of course, each teacher works in his or her own way in the classroom but most have been found to appreciate detailed, explicit suggestions which they can use, and adapt, in the knowledge that they have worked well for others. Such materials are provided in each module package.

Assessment tasks play an important role in the curriculum, providing targets that help students and teachers recognise objectives more clearly and help them to progress towards them. (The effect of assessment on the curriculum has often been to narrow and distort its aims but, equally, assessment can be used to enhance what is achieved.) In a new curriculum component like this one, assessment is particularly important. Thus assessment tasks are provided throughout these materials. They relate closely to the Scheme of Assessment for the Certificate of Numeracy through Problem Solving offered by the Joint Matriculation Board, but may be used more widely.

The suggestions for further mathematical development provide a variety of ideas, together with discussion on how and when they might be introduced and linked to the more traditional teaching of mathematical techniques.

Support materials are designed to help teachers with the new aspects of classroom activity and teaching style that this work involves. The materials relate to the three principal differences between this work and the traditional mathematics curriculum – the broader range of skills involved, the practical priorities of numeracy, and the much greater responsibility of the students for their own work. In the traditional curriculum students are largely *imitative*, here they are *autonomous* in deciding on and carrying through their approach to the task. The primary support is provided by the teaching suggestions in the classroom materials and elsewhere in each Teacher's Guide. The support materials, which form a separate package, take this further, sharpening awareness and tackling more fully and deeply the teaching and assessment issues and skills involved. They may be regarded as a do-it-yourself in-service course, designed to be used either on a distance-learning basis by teachers in a school or within LEA or college courses. This material, which is linked particularly to the 'Be a Paper Engineer' module, includes a video of the modules in use, together with comments from teachers and students on the work, its challenges and its benefits.

Introduction to Plan a Trip

Most school trips are organised and run by teachers, and the educational objectives are met by activities which take place at the destination. The students therefore learn little about the processes that go into the original planning. In this module, however, the students take on the responsibility for planning, organising and going on a trip during school time. The destination is largely irrelevant, as the main objective is to increase the students' ability to make, implement and learn from their own decisions and thus feel more confident when moving beyond the immediate surroundings of their own homes, school or town centre. The planning skills developed may also be utilised within other contexts.

The planning process is arranged in four stages.

1. Looking at trips. In a card game simulation, groups undertake and record imaginary trips, encounter problems and errors of judgement, then seek to correct them by better planning. (This involves the strategic skill of 'evaluating a plan and identifying faults in it'.)

2. Making rough plans. Groups share ideas of possible places to go and produce a leaflet explaining these ideas. The class then work together to reach a decision on the best destination and look at possible means of transport. (This involves 'generating lists of alternatives', 'devising a satisfactory rough plan', and 'using and describing a decision making process'.)

3. Making detailed plans. The class lists, and then shares out and undertakes the preparatory tasks that need to be done before the trip can take place. (This involves 'obtaining and interpreting information from a variety of sources', 'identifying omissions in given information', 'placing given jobs in a logical order', 'completing a clear and comprehensive final plan' and 'taking an active part in the planning process'.)

4. Going on your trip and evaluating it. The trip now takes place and, afterwards, the students reflect on what happened. (This involves 'evaluating a plan which has been implemented'.)

Chapter 1 provides classroom materials and teaching suggestions for the sequence of activities.

The range of mathematical techniques required, and the tactical skills needed for their deployment, will depend on the level of ambition in the choice of destination and mode of transport. The range is likely to include

- carrying out simple calculations with money and time
- sequencing preparatory tasks
- selecting and interpreting information presented in various ways (for example, maps, timetables, two-way tables, directories, brochures)
- obtaining information, including the use of letters and the telephone
- drawing up timetables for the trips
- reaching agreement via some kind of voting system.

These aspects are discussed further in Chapter 2, while Chapter 3 is concerned with assessment.

Classroom materials

Classroom materials

Introduction

This chapter provides a detailed guide to the classroom materials. The suggestions are offered in the recognition that every teacher has an individual style in which he or she prefers to work. Many teachers, however, have found it helpful to be given detailed suggestions which they can then adapt to meet their own needs. This has also enabled us to offer an approach which we have seen working well in a representative range of classrooms.

The classroom materials are centred on the Student's Booklet which is important for the following reasons.

■ It provides students with a coherent structure for their work. At any point, it should help students to have an overview of what they have achieved and where they are going.

■ Students who are inexperienced in planning often latch on to safe, familiar ideas without carefully considering a range of alternatives. The booklet will help to slow down and stimulate the more impatient or less imaginative students by, for example, asking them to list and discuss a range of destinations and methods of transport before they embark on one particular plan.

Much of the work involves students working collaboratively. It is often difficult to assess an individual's contribution to the work of a group, so we have also included a number of short assessment tasks, associated with each stage, which provide evidence of what a particular student can do on his or her own. You will find more detailed suggestions on how to use these tasks in Chapter 3.

Real problem solving in the classroom demands a different balance of teaching styles and strategies from that in the traditional mathematics curriculum. The emphasis on student-led decision-making will be unfamiliar to some teachers. For this reason, we offer the following suggestions which have been found helpful.

Your role will involve rather less task setting and explaining than you may be used to. Instead, you will be acting more as an adviser and resource, responding to students rather than directing them. It is helpful if you can

■ listen to students and ask questions which may help them to clarify their own thinking and move beyond superficial discussions

■ encourage students to listen to one another, making sure that the less forceful or less articulate are given the chance to express their views

■ help students to pace their work by agreeing target dates by which phases of their work should be completed

■ avoid 'taking over' by suggesting your own ideas and making decisions for students. Try to make students feel that it is *their* trip by allowing them to take on as much responsibility as possible.

These suggestions are amplified in the Checklist which may be found on the final page of this book.

Stage 1 Looking at trips

In this stage, you will be working in groups of 2 or 3.
To begin with, you will play

> The Matlock Bath game.

This game involves going on an imaginary trip, making decisions and learning from what happens.

Then, you will be asked to think about

> Trips *you* have been on.

These two activities should give you some ideas about what needs to be done and what mistakes must be avoided when planning your own class trip.

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Stage 2 Making rough plans

Your group will now try to make a rough plan for a trip which the whole class would like to go on.

This will involve . . . .

- brainstorming
- choosing the best ideas from your group
- producing an 'Ideas' leaflet
- presenting your ideas to the rest of the class
- deciding upon the best place to go.

Before you start, your teacher will tell you when you can go and how long your trip can take.

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Summary of activities

Time needed

About 2 hours.

Students' activities

- Playing 'The Matlock Bath Game'. This game simulates a whole trip in an interactive way. Students have to make decisions and experience the consequences. They are also given the opportunity to set their own challenges and become familiar with real timetables and information leaflets. These are group activities.

- Writing about trips they have been on and considering good and bad aspects. This could be an individual activity, possibly for homework, or form the basis for a group discussion.

The teacher's role

- Helping students to understand the game and to record what happens.

- Encouraging groups to discuss the alternatives presented on each card before making decisions.

Time needed

About 2 hours.

Students' activities

- Brainstorming ideas about possible places to go, activities to do and methods of transport. Mainly an individual activity.

- Choosing the best ideas in discussion with the group.

- Producing leaflets which will communicate these ideas to the rest of the class. An individual activity.

- Deciding where to go. A class activity.

The teacher's role

- Making any external constraints clear to students. (For example, the date and duration of the trip.)

- Encouraging groups to be imaginative, but realistic, in their discussions.

- Ensuring that students take each others' views into account, especially when choosing a destination for the trip.

Stage 3 Making detailed plans

By now you should know where you're going!
In this stage you will be involved in . . .

- deciding what jobs need to be done
- sharing out the jobs and doing them
- reporting back and agreeing on details
- making sure that everything is ready
- completing the 'Final plan' sheet.

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Stage 4 Going on your trip and evaluating it
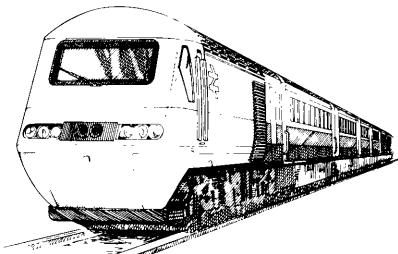
Now that all the plans have been made, you can go on your trip . . .

. . . and compare what you *thought* would happen with what *actually* happens.

You may like to keep a record of your trip by taking some photographs.

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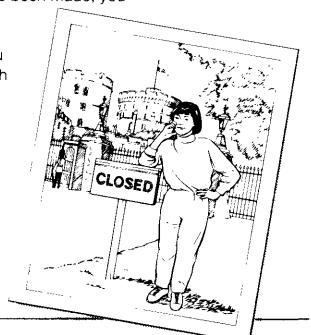
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Time needed

This will depend on the complexity of the trip and the size of the class. It may be preferable to spread the work over 2 or 3 weeks (interspersing it with normal class work) as there may be delays in obtaining information.

Students' activities

- Deciding what jobs need to be done. A group activity followed by a class activity.

- Sharing out jobs, doing them, and reporting back on the progress that has been made. Class discussions, interspersed with group activities.

- Making sure that everything is ready, and completing the final plan. A class discussion followed by an individual activity.

The teacher's role

- Helping the students to produce a complete list of jobs.

- Checking that groups are completing their jobs satisfactorily.

- Helping the student who is responsible for co-ordinating the work of the class.

Time needed

In addition to the trip itself, up to 1 hour will be needed for evaluation.

Students' activities

- Going on the trip.

- Thinking about the trip and comparing what actually happened with the plan. A group activity.

- Evaluating the trip and, in particular, identifying gaps in the planning. An individual activity.

The teacher's role

- Accompanying students on the trip.

- Encouraging students to criticise in a constructive manner.

Preparation

It is perhaps worth emphasising that a 'trip' does not have to mean a day-long coach outing to some far-flung destination. Indeed, an over-ambitious trip may force you to take over too much of the planning, and thus undermine the educational value of the module. A short afternoon visit to a local place of interest using public transport, for example, may provide a more accessible challenge and offer greater opportunities for students to work autonomously. We therefore recommend that, especially for the less confident, you set constraints which encourage students to explore possibilities locally.

Organising a trip out of school raises issues of legal responsibility. Although the students should always feel that it is their trip, legally you (and any accompanying colleagues) will be held responsible. You will therefore have to ensure that school and LEA (where appropriate) policies and procedures are followed correctly. Perhaps if the students were also made aware of these, they might be able to take them into account when suggesting possible plans.

The following checklist suggests some of the things that need to be done before work begins on the module.

- Choose one or two possible 'trip' days. These should fall at least 4 weeks after the beginning of the work.

- Check for possible school calendar conflicts. (This avoids the disappointment of postponing a trip because of, say, a school careers visit.)

- Familiarise yourself with the LEA and school policies on school trips. (These include matters such as advance notice, insurance, staff-student ratios, gender of staff.)

- See and obtain the support of key people (including other staff and the headteacher).

- Check that supply cover is available for the lessons you will miss.

- Find out if there is any money available or if the trip has to be totally self-financing.

- Make a list of the constraints that will be imposed. (For example; 'We must go on Wednesday afternoon . . . , the venture must be self-financing . . . , sorry, I'm just not prepared to go windsurfing!'.)

Equipment needed

When needed	Item	Quantity	Source
Throughout the module	Student's Booklets	1 for each student	supplied
	Envelopes or folders in which to keep work	1 for each student	
	Rough paper	a plentiful supply	
Stage 1	'The Matlock Bath Game'	8 sets for a class of 25	supplied
	Matlock Bath tourist information	1 set for the class	supplied in polythene bag
	Nottingham street map	1 for each student	master supplied
	Local bus and train timetables (optional for this stage)	At least 1 set per class	
	'Record' sheets	3 or 4 for each student (one may be used for the assessment task)	master supplied
	'Trips I remember' sheets	1 for each student	master supplied
Stage 2	'Brainstorming' sheet	1 for each student	master supplied
	'Ideas leaflets'	1 for each student	masters supplied
	Assessment task (if required)	1 for each student	master supplied
Stage 3	'Jobs list' sheets	1 for each student	master supplied
	'Job cards'	1 set for the class	masters supplied
	'Job done' sheets	1 for each job (Approx 20 altogether)	masters supplied
	'Final plan' sheets	1 for each student	masters supplied
	Local travel and tourist information (see below*)	1 set per class	
	Stationery and other resources for organising the jobs (see below†)	1 set per class	

When needed	Item	Quantity	Source
Stage 3 *(contd)*	Assessment task booklet (if required)	1 for each student	masters supplied
	Assessment resources:		
	Pre-recorded tape	1 per class	supplied
	Cassette recorder	1 per class	
	National Express coach service leaflet	At least 1 per class	supplied in polythene bag
	Nottingham bus route map	At least 1 per class	supplied in polythene bag
	Local telephone directory	At least 1 per class	
	Local 'Yellow Pages'	At least 1 per class	
	Set of 8 leisure centre job cards	At least 1 copy	master supplied
Stage 4	'Evaluating your own trip' sheets	1 for each student	masters supplied

* In Stage 3, students will be involved in finding travel and tourist information. In order to speed up this process, it is helpful to maintain a file of up-to-date information which may be added to by both you and your students, and which is available for them to use on request. It could, for example, include a selection of bus route maps and timetables, train timetables, local street maps, Ordnance Survey maps of the region, and tourist information leaflets on local places of interest. In addition, students may need access to a telephone.

† The following items of stationery will be needed to help with the organisation of the jobs.

    A supply of rough paper

    2 small boxes labelled 'Finished jobs' and 'Unfinished jobs' (for storing the 'Job cards' and the 'Job done' sheets)

    A supply of paperclips

    A large sheet of paper (to make a 'Jobs schedule' poster)

    A marker pen

    A supply of drawing pins or 'Blu-Tack'

Stage 1 Looking at trips

Introduction

This stage begins with a simulation game based on a variety of alternative trips from Nottingham to Matlock Bath in Derbyshire. This is designed to make students aware of the sorts of problems they may face when they are responsible for planning their own trip. As students play the game, they have to make decisions and experience the consequences of them, while carefully recording their expenditure of time and money. They are also invited either to play the game again, using the cards to make the game work out in a certain way (for example, finding the cheapest possible trip), or to use just timetables and information sheets to plan their own trip to Matlock Bath, starting perhaps from their own school. Finally, students are asked to discuss and write about trips they have experienced at first hand to see what may be learned from them.

Total time needed

About 2 hours.

Organisation and equipment required

The students will need to work in groups of 2 or 3 to play 'The Matlock Bath Game'. At one side of the classroom, the information leaflets from the polythene bag and copies of the 'Matlock Bath' map should be displayed and labelled 🛈. This represents the 'Tourist information office' referred to in the game.

Each group of students will need one set of cards.

Each individual student will need

- a Student's Booklet
- one 'Record' sheet
- one 'Trips I remember' sheet
- an envelope or folder in which to keep his or her work.

Some students may also ask for

- copies of the Nottingham street map
- local bus and train timetables (for the problem on page 7).

Related assessment criterion

This stage offers students the opportunity to show that they can

(i) evaluate a plan and identify faults in it, (including expenditure of money and time).

Plan a trip

This booklet will help you to plan a trip which your class will go on. There are four stages involved.

Stage 1
Looking at trips
pages 2–8

Stage 2
Making rough plans
pages 9–14

Stage 3
Making detailed plans
pages 15–22
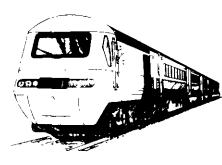
Stage 4
Going on your trip and evaluating it
pages 23–24

1

Stage 1   Looking at trips

In this stage, you will be working in groups of 2 or 3.
To begin with, you will play

The Matlock Bath game

This game involves going on an imaginary trip, making decisions and learning from what happens.

Then, you will be asked to think about

Trips *you* have been on.

These two activities should give you some ideas about what needs to be done and what mistakes must be avoided when planning your own class trip.

2

STAGE 1

The Matlock Bath game

Imagine that you live in Nottingham.
Your class is going on a trip to Matlock Bath, a small town in Derbyshire.
You have to organise the trip.

Your group will need

■ a pack of 'The Matlock Bath game' cards (numbered from 1–128)
■ a 'Record' sheet for each person.

3

Purpose

To introduce the module, to explain the purpose of Stage 1, and to give students some experience of the decisions that must be made and the consequences of making errors in the planning process.

Presentation

A class introduction, followed by group work and concluded with a reflective discussion.

Suggestions and comments

Issue the 'Plan a Trip' Students' Booklets and refer the class to the first page. Briefly explain that during the next few weeks the class will be planning and going on its own trip. Students may find it hard to appreciate that they are actually going to take on this responsibility. (Sometimes this is only fully understood when a problem occurs during the trip itself, and a student turns to you for help. 'Which way do we go now, Miss?' 'I don't know, *you* have to make the decisions!'.) Begin therefore by emphasising that it will be *their* trip, not yours. The constraints on the trip (for example, the date and duration) should be made clear right from the start so that students are encouraged to be realistic in their ambitions. They may, therefore, need to consider trips that are more localised and less expensive than those which may have been organised for them in the past.

Issue each group of students with a pack of Matlock Bath cards and some 'Record' sheets. Make sure that everyone understands the purpose of the game. The 'Record' sheets are included so that each group can keep track of the money and time spent on the imaginary trip.

STAGE 1

The cards describe what is happening on the trip, but there are many points in the game when *you* have to decide what to do. □1

The front of each card tells the story of the trip.

The back of each card asks you what to do next

How to play

■ Find card 1 in your pack, and note down '1' on side 1 of your 'Record' sheet.

■ Read the front of the card, then turn it over, and make your first decision. (You will tell people what to bring.)

■ Depending on your answer, take card 2, 3 or 4. Note down the number on your 'Record' sheet.

■ Now read this new card . . . and so on.

As you play the game . . .

■ Lay the cards you have used face upwards on the table
■ Fill in side 1 of your 'Record' sheet. □2

When you have finished playing . . .

■ Fill in side 2 of your 'Record' sheet. Your row of cards will tell the story of the trip.

■ Compare your trip with one from another group. Which would you prefer to go on? Why? □3

4

STAGE 1

Record sheet (side 1)

Record sheet (side 2)

5

---

1 Read through the instructions for playing the game. Check that everyone understands how to use the 'Record' sheet. You could start all the students off together by asking them to write '1' on the 'Record' sheet, then read card 1 and discuss the options given on the back. Students should then be able to continue the game in their groups, following the instructions on the cards.

2 Some students become so involved in playing the game, that they forget to keep their 'Record' sheets up to date or their used cards displayed separately from the rest of the pack. Remind them of these points so that they will be able to review the 'trip' when it has ended, using side 2 of the 'Record' sheet.

On the following pages, we have provided a network which displays every possible route through the cards. This can be used to check that card sequences are correct so that help may be given if a group gets into difficulty.

3 When two groups have completed their trips they should be brought together for discussion. In particular, they should compare their 'Record' sheets and try to identify any particularly good or bad decisions that were made.

The Matlock Bath Game

The three networks below illustrate all the routes through 'The Matlock Bath Game'. In general, routes lead from lower to higher numbers, with routes arriving at circles on the left and leaving on the right. All the data used were correct for the summer of 1987.

Although every effort has been made to ensure that all the complete routes are internally consistent, there are inevitably some which are less so than others. Your students will be keen to point these out to you. You or your students may wish to revise, improve or extend the game using the data in the pack.

You may like to try creating a similar game using tourist information relevant to your own locality, in which case the following suggestions may be of help.

■ Select a single destination which has a variety of alternative activities.

■ Ensure that you can travel to and from this destination using a variety of alternative routes, and that the fares are comparable.

But be warned, the time involved in constructing such a game is considerable!

Outward journey

At Matlock Bath

plan in Tourist Office   snack

choose another activity

45 — 46 — 47 — 48 — 49

50

in Tourist Office

from 96

Aquarium
64

Temple Lead Mine
65

Mining Museum
66

Gulliver's Kingdom
67

Amusement arcade
68

Heights of Abraham
69   71

Boating
70

75   less than 15 minutes left

72 — 73 — 76

quick snack

74 — 77   snack

little money

leave Matlock Bath

arrive at Matlock Bath   44

decide to plan   61

62   amusement arcade

Heights   snack
52 — 53 — 57 — 60
of Abraham
51   58

54 — 55
no plan   café
56   59

some money retained   63

all money spent   78

Return journey

1551
79   early train   arrive 5.00 pm Nottingham

87 — walk — 88   6 pm

86 — walk — 90

89 — bus — 91   bus 5.45 pm

3.30 pm
80   early bus   arrive 4.45 pm
92 — 94 — 93 — 95   bus   5.20 pm
97 — walk — 98   6.00 pm

96

to 72

17 14
81   later train   arrive Nottingham 6.15 pm

99

100   2 buses 7 pm
101 — 102   1 bus 7 pm
103 — 104   walk   7 15 pm
bus 7.30 pm

5.30 pm
82   later bus   arrive Nottingham 6.45 pm
105

107   walk   8.00 pm

leave Matlock Bath

5.30 pm
83   Robinson coach, arrive   106   school   6.30 pm

arrive at school

more food
109   arrive school 9.30 pm

6.00 pm   cheapo coach
84 — 108
110   9.00 pm

119   2 buses 8.00 pm

miss train
111   18 11 very late train   116   arrive Nottingham 19 09

121   1 bus 8.00 pm

pay extra 18 11

122   walk 8.15 pm

v. late train
114   more food

120   arrive Nottingham

115   go to police   117   9.20 pm   118   10.00 pm

miss coach
85 — 112

arrive Nottingham 8.40 pm

124 — 125   126   bus 9.15 pm

miss bus
113   very late bus 7.30 pm

123   arrive Nottingham 8.40 pm   127 — 128   walk 9.30 pm

STAGE 1

Either try a challenge from page 6 *or* try the harder problem on page 7.

> Put the cards back in order.
> Choose *one* of the challenges below.
> Use the cards to help you tackle your challenge.
> Note down what happens on a fresh 'Record' sheet.

Challenge 1
Find a trip that costs less than £6. Make it as interesting and varied as you can.

Challenge 2
Find a trip that takes you to as many different attractions at Matlock Bath as possible.

Challenge 3
Find the quickest trip which costs less than £4 and takes you up and down the Cable Cars.

Challenge 4
Find the worst possible trip. How many things can you get to go wrong?

Challenge 5
Make up a problem of your own and try to solve it using the cards.

6

STAGE 1

A harder problem . . .

> Try planning a different trip to Matlock Bath *without using the cards*.
>
> You could plan the trip starting from Greenwood Dale School *or* from your own school.
>
> The information you need may be found on the desk labelled *i*
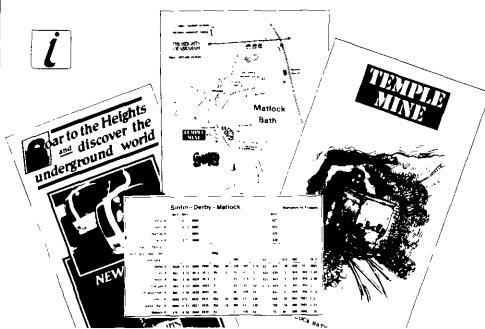
Plan it out on rough paper first – then write it out using a table like the one below:

Time	Where we will be and what we will be doing	What we will spend

7

The challenges on page 6 encourage the students to think more carefully about the planning decisions that they make in the game. If two groups take on the same challenge they could compare their results. Encourage students to set and try to solve their own problems using the cards.

The problem on page 7 is more difficult as it involves using timetables and information leaflets without the support of the cards. Groups that do this should keep in mind the trips they simulated with the cards so as to remember the necessary steps in planning.

Planning a trip from the students' own school to Matlock Bath is an interesting exercise, wherever the school is situated. It makes the task more real to them. If the school is far away, it is interesting to find the best route by train and whether or not it is possible to get there and back in a single day. From some places it may be necessary to book overnight accommodation!

STAGE 1

Trips you have been on

Think of other trips you have been on – from school, with your youth group, with your family . . .
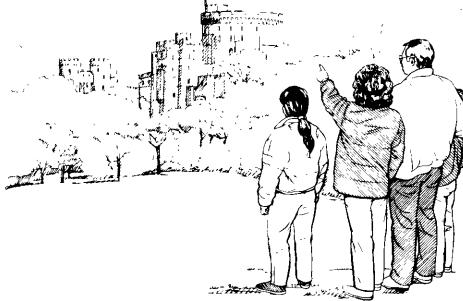
In your group, discuss trips you remember.
What was good about them? What wasn't so good?

Now fill in a copy of the 'Trips I remember' sheet.

Trips I remember

8

The final activity in this stage offers students the opportunity to think reflectively about other trips they have been on. The activity could begin with a short class discussion. Students should be encouraged to notice which problems were caused because of bad planning and which were unfortunate occurrences that could not have been anticipated (for example, a puncture). It may also be worth asking students to recall how such problems were overcome.

Each student should fill in a 'Trips I remember' sheet, recalling his or her experiences.

Assessment task for Stage 1

The 'Record' sheet

The assessment task which relates to the Stage 1 assessment criterion is described below. This task may be helpful when deciding whether or not a student can

(i) evaluate a plan and identify faults in it (including expenditure of money and time).

Chapter 3 contains a more detailed discussion of assessment issues, including suggestions for marking and record keeping.

This task requires each student to work on one of three alternative routes through the Matlock Bath cards, completing a 'Record' sheet during the process. Select from the Matlock Bath packs, sufficient sets of the following cards, so that each student undertaking the assessment has a set.

The three sets are

Set A 2, 6, 15, 17, 19, 27, 44, 51, 54, 56, 60, 62, 63, 80, 93, 95.

Set B 3, 5, 9, 10, 44, 51, 52, 53, 58, 60, 62, 78, 84, 108, 110.

Set C 4, 6, 11, 13, 14, 24, 26, 31, 32, 41, 44, 45, 46, 47, 50, 69, 71, 72, 73, 75, 79, 86, 89, 91.

Issue each student with a 'Record' sheet and arrange the students so that neighbouring students have different card sets.

Each student should fill in a 'Record' sheet while working through one of the three sets.

Card number 44 is common to all 3 sets, and as there will be insufficient copies, you could either summarise the contents of this card on the blackboard or photocopy enough copies for everyone. Cards 6, 51, 60 and 62 occur in 2 of the 3 sets, so you may need a few extra copies of these, too.

You will need to issue the following additional information to clarify the decisions to be made on some cards, as follows

Set C 26 – have snack costing 60p
32 – have snack costing 60p
47 – it takes 20 minutes to go to the Tourist Information Office
71 – you spend 60p at the Woodlanders and you reach the bottom of the cableway at 3.40 pm.

The three sets are broadly comparable, though set C is probably the hardest to work through.

Solutions to the assessment tasks for Stage 1

Illustrated below is a typical solution to each of the three tasks. The correct completion of side 1 is likely to show little variation from the examples given here, but the comments on side 2 will depend to an extent on the student's own view of what constitutes a good or bad point.

Some students may add extra time allowances for walking from one activity to the next at Matlock Bath and so produce slightly different time schedules from those shown here.

Set A

STAGE 1

Record sheet (side 1)

Name _____

Cards used (in order)
2, 6, 15, 17, 19, 27, 44, 51, 54, 56, 60, 62, 63, 80, 93, 95

How we travel to Matlock Bath. . . (bus)/coach/train

Where the money goes
Use this table to keep track of how much money you have left during your trip.

How much money each person starts with . . . £ 5 00

How we spend our time at Matlock Bath

The time when we arrive . . . 12.35

The time(s) when we can leave . . . 3.30, 5.30 pm

What money is spent on	How much is spent	What is left to spend
Bus fare	15p	£4·85
Bus fare	1 75	£3 10
Heights of Abraham	1 95	£1·15
Amusement arcade	£1·00	15p
Bus fare	15p	—
Total amount spent	£ 5·00	

What we do at Matlock Bath	How long it takes	What the time is after we've done it
cable car (Heights of ab)	½ hour	1 05 pm
checking	¼ hour	1.20 pm
Amusement arcade	2 hours	3.20 pm
walk to catch bus	10 min	3 30 pm

M1

Record sheet (side 2)

When you have *finished* playing the card game, fill in this side of the record sheet.

We left Greenwood Dale at 10.45 am

We spent 3 hours at Matlock Bath.

We got back at 5.20 pm.

We took £ 5 with us and spent £ 5.

So we returned home with £ 0

Good points about the trip

The cable car

Bad points or things that went wrong on the trip

did not take enough money
wasted our Heights of Abraham ticket
spent too much on the bus fare
didnt plan what to do

Time	What we were doing
9·00	
10·00	
11·00	bus to town
12·00	on bus to Matlock Bath
1·00	on cable car
2·00	amusement arcade
3·00	amusement arcade
4·00	on bus back to Nottingham
5·00	at bus stop on Long Row East
6·00	home
7·00	
8·00	
9·00	
10·00	
11·00	
12·00	

M2

Set B

STAGE 1

Record sheet (side 1)

Name _____

Cards used (in order)
3, 5, 9, 10, 44, 51, 52, 53, 58, 60, 62, 78, 84, 108, 110

How we travel to Matlock Bath. . .   bus (coach) train

Where the money goes

Use this table to keep track of how much money you have left during your trip.

How much money each person starts with . . . £ 10

How we spend our time at Matlock Bath

The time when we arrive .   2 30 pm

The time(s) when we can leave . . .   5 . 30 pm

What we do at Matlock Bath	How long it takes	What the time is after we've done it
Cable car (Heights of Abraham)	½ hr	3.00 pm
snack	20 mins	3.20 pm
mine and cavern	1 hour	4.20 pm
amusement arcade	55 mins	5.15 pm
walking	10 min	5.25 pm
wait for coach	35 min	6 00 pm

What money is spent on	How much is spent	What is left to spend
Coach	£2·50	£7·50
Heights of Abraham	£1·95	£5·55
snack	75p	£4·80
amusement arcade	£4·80	—
Total amount spent	£ 10 00	

M1

Record sheet (side 2)

When you have *finished* playing the card game, fill in this side of the record sheet.

We left Greenwood Dale at __12.00__.
We spent __3½__ hours at Matlock Bath.
We got back at __9.00 pm__.
We took £ __10__ with us and spent £ __10__.
So we returned home with £ __0__

Good points about the trip

The cable car
The mines and cavern

Bad points or things that went wrong on the trip

bad coaches   kept breaking down
we didn't plan properly
we spent too much on amusements
very hungry when we got home
Too much time spent travelling

Time	What we were doing
9·00	
10·00	at school
11·00	at school
12·00	getting on the coach
1·00	on the coach
2·00	on the coach
3·00	getting off cable cars
4·00	going around the mines
5·00	amusement arcade
6·00	get on coach
7·00	coach broken down
8·00	other coach arrives
9·00	arrive home
10·00	
11·00	
12·00	

M2

Set C

STAGE 1

Record sheet (side 1)

Name _____

Cards used (in order)

4, 6, 11, 13, 14, 24, 26, 31, 32, 41, 44, 45, 46, 47, 50, 69, 71, 72, 73, 75, 79, 86, 89, 91,

How we travel to Matlock Bath. . .   bus/coach/(train)

Where the money goes

Use this table to keep track of how much money you have left during your trip.

How much money each person starts with . . .   £ 7·00

How we spend our time at Matlock Bath

The time when we arrive . .   2·40pm

The time(s) when we can leave . . .   1551 1714

What we do at Matlock Bath	How long it takes	What the time is after we've done it
go to tourist info	20 min	3.00 pm
choosing what to do	¼ hour	3.15 pm
Heights of Abraham	25 min	3.40 pm
run for train	10 min	3.50 pm
catch train	1 min	3.51 pm

What money is spent on	How much is spent	What is left to spend
bus fare	15p	6 85
crisps and cake	50p	6 35
snack	60p	5·75
train fare	£1 65	4·10
snack	60p	3·50
Heights of Abraham	£1·75	1 75
cafe	60p	1 15
bus fare	10p	1 05
bus fare	15p	0·90
Total amount spent	£ 6 10	

M1

Record sheet (side 2)

> When you have *finished* playing the card game, fill in this side of the record sheet.

We left Greenwood Dale at 10·45 am
We spent 1 hr 11 min hours at Matlock Bath.
We got back at 5·45 pm .
We took £ 7·00 ___ with us and spent £ 6·10 .
So we returned home with £ 0·90

Good points about the trip

trip on a cable car

Bad points or things that went wrong on the trip

missed train
long wait at Derby station
caught the train back too early
shouldn't have had so many snacks

Time	What we were doing
9·00	
10·00	at school
11·00	on the bus
12·00	having snack
1·00	arrive at Derby station
2·00	on Derby station
3·00	go to tourist information office
4·00	on train back
5·00	reach Nottingham station
6·00	arrive home
7·00	
8·00	
9·00	
10·00	
11·00	
12·00	

M2

Stage 2 Making rough plans

Introduction

The activities contained in this stage develop a number of important strategic skills which may be applied to other planning and organising tasks. These activities, which many students are likely to find unfamiliar, include

- exploring a wide range of alternatives before deciding on a particular idea
- considering the needs and interests of all those involved, rather than making a personal choice
- making reasonable guesses about unknown facts in order to inform a decision
- presenting an idea to other members of the class
- discussing various decision-making processes and using them to choose the 'best' trip destination.

Total time needed

About 2 hours, but possibly longer if reaching a class decision proves difficult.

Organisation and equipment required

Students will need to work in groups of 2, 3 or 4 for most of this stage. As the work progresses, groups could be re-formed according to their preferred trip destination.

Each student will need

- a 'Brainstorming' sheet
- an 'Ideas leaflet'.

Related assessment criteria

This stage offers students the opportunity to show that they can

   (ii) generate lists of alternatives,

   (iii) devise a satisfactory rough plan (including sensible costings and time schedules),

   (iv) use and describe a decision-making process.

Stage 2 Making rough plans

Your group will now try to make a rough plan for a trip which the whole class would like to go on.

This will involve . . . .

- brainstorming
- choosing the best ideas from your group
- producing an 'Ideas' leaflet
- presenting your ideas to the rest of the class
- deciding upon the best place to go.

Before you start, your teacher will tell you when you can go and how long your trip can take.

9

STAGE 2

Brainstorming 1

You will each need a copy of the 'Brainstorming' sheet.
On your own, make a list of

- places you could visit
- what you could do there
- how you could travel.

The Leisure Centre would be good. We could go swimming or play squash and we could go by bus.

Name *Yasmeen*   Comments

Brainstorming

Where we could go   What to do there   How we could go

Leisure Centre   Swimming   Bus
                      Squash
                      Badminton
Jodrell Bank   See telescope   Coach
                      planetarium

10

STAGE 2

Choosing the best ideas

Now look at all the lists that your group has produced. Give each person a chance to explain his or her ideas. 2

What about a visit to Belvoir Castle?

That's miles away, too far, too expensive.

What about ice skating then?

I like swimming best.

I don't think everyone will want to do that.

You could do that anytime. I think it's boring.

There's more choice at the Leisure Centre. We could easily get there by bus.

Some of the ideas may not be good choices for a class trip because

- they are too far away
- they are too expensive
- some people in the class may not want to go.

Cross these off your list.

Now (ring) the best ideas.

Aim to make your trip as interesting as possible for *everyone* in your class. Remember to cater for all tastes . 3

11

Purpose

To give students the opportunity to think of a wide range of possibilities before sharing their ideas in a group.

For everyone to share ideas and reach agreement on which ideas are worthy of further development.

For students to learn how to listen to and discuss constructively with one another.

Presentation

Class discussion, followed by individual reflection and then by group discussion.

Suggestions and comments

1 You may like to introduce the 'Brainstorming' activity by asking for one or two ideas for each of the different sections on the sheet, and listing these on the blackboard.

Encourage students to fill in as many ideas as they can, before discussing them. This will ensure that every student has something to contribute to the group discussion which follows.

2 This may need emphasising, as there is sometimes a tendency for one or two people in a group to dominate the discussion, by pushing their own ideas forward and ignoring those suggested by other students.

3 Students often find it hard to devise a suitable trip which both satisfies the external constraints and caters for the interests of other members of the class. Emphasise that if they fail to do this, then there is little likelihood of their ideas being adopted.

STAGE 2

Producing an 'Ideas' leaflet

In your group, look at the ideas that are ringed. Try to decide which is the best choice for a class trip. Each person in your group must then fill in an 'Ideas' leaflet explaining this choice. (You may disagree on some details, but this doesn't matter.)

Your leaflets should say . . .

- where the place is
- what people will do there
- how you might travel
- how much it might all cost
- rough times (when would you leave, arrive at the place, leave to return and get back).

If you don't know all these facts, try to make a reasonable guess. You can find out exact details later.

12

STAGE 2

Presenting your ideas to the rest of the class

When your leaflet is finished, do the following.

- Swap it with one from another group. [1]
- On the back of the leaflet, note down any good or bad points about it. [2]
- Now swap this leaflet with one from a different group, and so on, until you've seen a leaflet from each group.
- Get your leaflet back again and improve it, using the comments.

Each group will now take it in turns to

- 'sell' an idea to the rest of the class and try to convince everyone that they would enjoy the trip. [3]
- answer questions about it.

So, the leisure centre is cheap, you get a long time there and there is plenty to do.

Can you play snooker there?

But what can you do if you don't like sport?
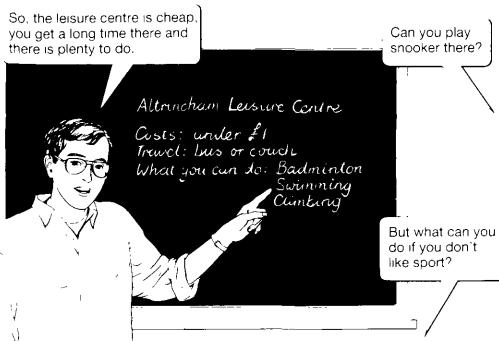
13

Purpose

To offer students the opportunity to make a rough plan for a trip, check its feasibility and persuade the rest of the class that it is a good idea.

Presentation

Group discussion followed by individual work and a group presentation to the whole class.

Suggestions and comments

At this point, it may be necessary to rearrange the groups slightly so that each group is now working on a single trip choice.

Each student should fill in a copy of the 'Ideas leaflet'. This should contain sufficient information for the class to make a decision as to the feasibility of the trip and should be presented in an attractive and persuasive manner.

Some students may have difficulty in estimating costs and times. Encourage them to compare the information they need with practical knowledge that they already possess. For example,

'it takes the bus half an hour to get into town. The leisure centre is about twice as far so it will probably take about an hour to get there . . .'

Students should not spend too much time researching information for this activity, as most of these suggestions will not be used for the final class trip. However, promising ideas that are not chosen could form the basis for a small group trip which could take place out of school time.

[1] You will need to organise the exchanging of leaflets so that everyone has a chance to see a leaflet from each of the other groups.

[2] Some students instantly dismiss ideas that are not their own. They should be encouraged to comment on *every* idea in a detached, objective manner and perhaps think of ways in which their own preferences could be incorporated into someone else's trip.

[3] Each group should be given a few minutes to present its ideas to the rest of the class, leaving time for questions at the end.

STAGE 2

Deciding upon the best place to go

There may be one idea that everyone is happy with, but this is unlikely. You will need to find a way of deciding on the best place to go, so that

- *everyone's* views are taken into account
- *everyone* will accept the chosen idea.

One way is to use a voting system of some kind. Here is an example:

Who has put the leisure centre down as their first choice?
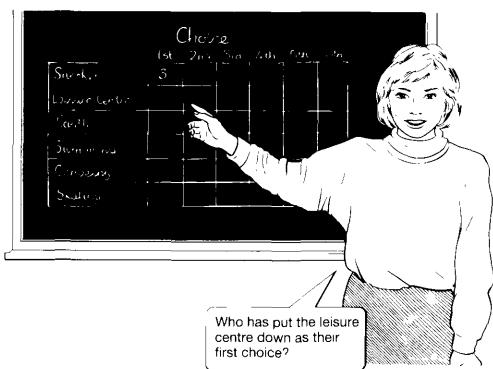
Reaching agreement may take time, but you shouldn't rush this important step.

14

Purpose

To consider alternative decision-making methods and then to decide corporately on the best place to go for the trip.

Presentation

Class discussion.

Suggestions and comments

Begin by reminding the class of the external constraints that the trip has to meet, and then ask students to suggest alternative decision-making processes. List these on the board. For example,

'We could toss for it'

'Show of hands'

'Secret ballot'

'Put these ideas in order of preference'

'Eliminate the least popular ideas'.

It is worth taking time to use two or three of these methods to see if the same result emerges.

If the majority of the class favour the same destination, the decision may be straightforward. The class should still, however, consider carefully any minority views and try to take them into account.

If there is no clear decision, students may need to consider making compromises or revising their proposals.

As a last resort it may be possible, in some cases, to have two trips, or alternative destinations within one trip.

Assessment tasks for Stage 2

There are 3 tasks that relate to the assessment criteria for Stage 2. The tasks may be helpful in deciding whether or not a student can

(ii) generate lists of alternatives,

(iii) devise a satisfactory rough plan (including sensible costings and time schedules),

(iv) use and describe a decision making process.

Tasks 1 and 2 should already have been completed during the normal course of the work. They help in assessing criteria (ii) and (iii) respectively. Task 3 is new and may be completed at the end of Stage 2. This task is designed to assess criterion (iv).

Stage 2   Assessment task 1

'Brainstorming' sheet

Name

Brainstorming				
Where we could go	What to do there	How we could go	Comments	

Stage 2   Assessment task 2

'Ideas leaflet'

Ideas leaflet

Filled in by

Come on our trip to . . .

What you can do there . . .

Possible travel details . . .

Rough costs . . .

Rough timetable

Time	Where you will be and what you will be doing

The vote

Six people are planning a trip. Six different places have been suggested:

a) The ice rink
b) Zoo
c) Bowling alley

d) A castle
e) Snooker hall
f) Swimming pool

In order to choose between these places, they decide to vote.

Each person is given a list, and they write down their preferences.

This is what they write:

Sanjay

a) Ice Rink **6th choice**
b) Zoo **1st choice**
c) Bowling **3rd choice**
d) Castle **2nd choice**
e) Snooker **4th choice**
f) Swimming **5th choice**

John

a) Ice Rink **1st Choice**
b) Zoo **2nd Choice**
c) Bowling **5th Choice**
d) Castle **4th Choice**
e) Snooker **3rd Choice**
f) Swimming **6th Choice**

Claire

a) Ice Rink **6th choice**
b) Zoo **5th choice**
c) Bowling **1st choice**
d) Castle **2nd choice**
e) Snooker **4th choice**
f) Swimming **3rd choice**

Mike

a) Ice Rink **4th choice**
b) Zoo **6th choice**
c) Bowling **5th choice**
d) Castle **3rd choice**
e) Snooker **1st choice**
f) Swimming **2nd choice**

Elaine

a) Ice Rink **6th choice**
b) Zoo **3rd choice**
c) Bowling **2nd choice**
d) Castle **1st choice**
e) Snooker **4th choice**
f) Swimming **5th choice**

Jenny

a) Ice Rink **6th choice**
b) Zoo **5th choice**
c) Bowling **4th choice**
d) Castle **2nd choice**
e) Snooker **3rd choice**
f) Swimming **1st choice**

Which place would be the best choice for their trip? _____

Explain how you get your answer:

_____

_____

_____

_____

_____

_____

_____

_____

M7

Stage 3   Making detailed plans

Introduction

This stage involves the detailed planning of the trip. When the class has agreed on the list of jobs that need to be done, they are shared out and worked on by small groups of students. Many of these tasks involve the use of mathematical skills (reading timetables, estimating costs and so on). Students should be encouraged to use whatever skills they possess, but they may need to learn others to increase the efficiency and reliability of their planning. At various stages, groups will need to report back on their progress and ask advice from the rest of the class. At the end of the stage a complete detailed 'Final plan' is drawn up.

During this stage, there may be times when students are not fully occupied. For example, they may be unable to start a job until an earlier one has been completed. There are several ways this 'dead time' can be used constructively.

- The first six assessment tasks can be organised as a 'circus' of practical activities which may be attempted at any time and in any order by individual students. They are described more fully below.

- Students may like to plan small-scale 'group trips'. (These trips could be based on the ideas from Stage 2 which were not adopted and could take place out of school time.)

- The work on this stage can be spread over 2 or 3 weeks, interspersing it with work of a different kind altogether.

Total time needed

About 2 to 3 hours, possibly spread out over 2 or 3 weeks.

Organisation and equipment required

Initially the whole class will need to work together in teacher-led discussion. The rest of the work is done in small groups.

You will need

  1 'Jobs list' sheet for each student
  1 set of 'Job cards' (folded to A5)
  A supply of about 20 'Job done' sheets
  1 'Final plan' sheet for each student.

You should also provide

  A file of local travel information (containing street maps, bus and train route maps, timetables and so on)
  Access to a telephone and local telephone directories
  A supply of rough paper
  2 small boxes labelled 'Finished jobs' and 'Unfinished jobs' (these are for storing the 'Job cards' and the 'Job done' sheets)
  A supply of paperclips
  A large sheet of paper (to make a 'Jobs schedule' poster)
  A marker pen
  A supply of drawing pins or 'Blu-tack'.

In addition, the assessment tasks require

1 pre-recorded tape of a British Rail talking timetable
1 cassette player
1 National Express coach service leaflet
1 Nottingham bus route map
At least 1 local telephone directory
At least 1 'Yellow Pages' directory
At least 1 set of the 8 small 'Leisure centre job cards'.

The instructions for setting up the assessment 'circus' is given on page T40.

Related assessment criteria

This stage offers students the opportunity to show that they can obtain and interpret information from

(v)   a telephone directory,
(vi) aural and written timetables,
(vii) a street map,
(viii) a route map,

and can

(ix) identify omissions in given information,
(x)   place jobs in a logical order,
(xi) complete a clear and comprehensive final plan,
(xii) take an active part in the planning process.

Stage 3   Making detailed plans

By now you should know where you're going!
In this stage you will be involved in . . .

- deciding what jobs need to be done

- sharing out the jobs and doing them

- reporting back and agreeing on details

- making sure that everything is ready

- completing the 'Final plan' sheet.

15

STAGE 3

Deciding what jobs need to be done

You have decided where you are going, but there are lots of jobs to be done before you go.
In your group, make a list of all the jobs that you can think of. ☐1

We'll need to find out about buses.

What about trains?

O.K. I'll write that down.

Someone will need to find out when it's open.

Someone will have to phone up

Other people may have thought of jobs you've missed. On the blackboard make a *complete* list of all the jobs that your class has thought of. ☐2

16

STAGE 3

You will need a copy of the 'Jobs list'. ☐3

Jobs list

Job must be done before (date)

Fri 10th
Fri 3rd
Wed 8th
Fri 3rd
Tues 31st
Tues 4th

In your group

■ cross out any jobs that don't apply to your trip
■ add any jobs that are missing
■ make up some deadlines for doing each of the jobs.

Your class must now agree on the jobs and the deadlines.
Your teacher will have a set of job cards to help. ☐4

Do we need to do this job?
If so, when should it be done by?

Find out about coaches

You may have to make some extra job cards.

17

Purpose

To enable students to decide what jobs need to be done, when they need to be done by, and to organise a procedure for sharing them out and doing them.

Presentation

Group work followed by class discussion.

Suggestions and comments

☐1 Issue each group with some rough paper and ask students to note down all the jobs that they can think of which they need to be done before the trip can take place. For further ideas, they could also think back to 'The Matlock Bath Game' and recall what happened and what was done and decided.

☐2 When groups have completed their lists you, or a member of the class, could write the ideas on the board. Working through the trip step by step may help to organise these ideas.

☐3 The 'Jobs list' is provided to save students from having to copy down laboriously the jobs – it also serves as a check that vital jobs have not been forgotten. The groups should start to think about deadlines and thus begin to consider the order in which these jobs should be done. Encourage students to fill in these dates by working backwards from the date of the trip itself.

☐4 There is a 'Job card' corresponding to each of the jobs listed. It is helpful to use these to agree on the actual jobs that need to be done. They could then be sorted, initially, into two piles; those that can be done immediately and those that must wait until other jobs have been completed. New 'Job cards' may need to be written at this point.

The role of job coordinator is crucial. It is best if a student or pair of students takes on this task, but you may prefer to do it yourself. In this case it is worth removing the coordinator job card from the pack, beforehand.

STAGE 3

Sharing out the jobs and doing them

Your class now needs to share out the most urgent jobs.
Each group will need a different 'Job card' and a 'Job done' sheet.

5

Job done

Our job   Find out about coaches
Done by   Yasmeen, Catherine, Philip
What we did or found out

There are two possible coaches
and the ...

✓

Find out about
coaches

While jobs are being shared out, someone should make a 'Jobs
schedule' poster to keep a record of

6

- what needs to be done
- when it must be done
- who is responsible for
  doing it.

Jobs schedule

Job	Must be done before	Who is doing the job	When done
Ask permission from teachers	Friday 3rd	Sarah, Alistair	✓
Write letter to parents	Thursday 9th	Paul, Tom, Errol	
Visit	Monday 6th	Collette, Sanjay, Alex	✓

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STAGE 3

When you have finished doing a job, record all you did or found out on
your 'Job done' sheet. Then . . .

7

Attach your 'Job done' sheet
to your 'Job card'. Put
these into the 'Finished
jobs' box

Tick off the job on the
poster so that everyone
knows that you have
finished your job

Jobs schedule

Choose another job to do
Try to make it the next
most urgent job

8

For some jobs, groups will need to report back . . .

19

---

5   The most urgent 'Job cards' should now be shared out among the groups. These are likely to include those to do with asking permission and finding out travel details. The remaining cards should be stored in a box (labelled 'Unfinished jobs') at one side of the room.

6   The 'Jobs schedule' poster is a suitable task to give to the job coordinator. You may need to help in checking deadlines and ensuring that everyone has something to do.

7   Students should write complete summaries of what they have done on the 'Job done' sheets, and attach them, together with any other relevant details (maps, timetables etc), to their 'Job cards'. (If the 'Job cards' are folded in half, to A5 size, then these can be tucked inside and fastened with a paper clip.) These should then be placed in a second box (labelled 'Finished jobs') at the side of the room, for future reference by other class members.

8   The coordinator may like to take on the responsibility for allocating jobs. If no new jobs are available, then the students could take this opportunity to attempt some of the assessment circus, or work on their own group trips.

STAGE 3

Reporting back and agreeing on details ⑨

From time to time people will want to tell the class what they have done, and ask for opinions on what to do next . . .

I've been checking on coaches. It will cost £70 to hire one – that works out at about £3.50 each. Is that alright with everyone?

No, it's too much.

Have you thought of using the school minibus?
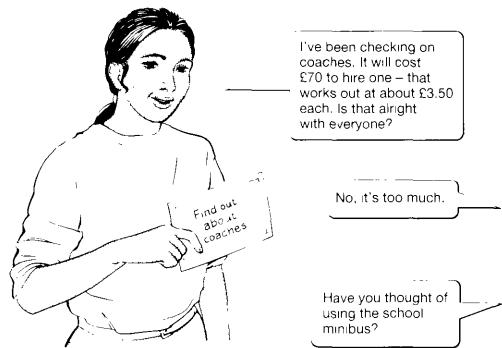
Often, one job will lead to another.
You may need to add new jobs to the poster as you go along.

20

STAGE 3

Making sure that everything is ready

Now talk through the day together, from start to finish – just as if you were on the trip. ⑩

Go through every detail and try to make sure you haven't forgotten anything.

Make sure that all the jobs have been completed.

So, we'll each bring £3.50, some old clothes, a cagoule, a packed lunch, and a torch
When do we leave school?

12.00, meeting at the bus stop

Which bus?

We'll catch a 10 to the station

Which train do we catch?

21

⑨ Groups should report back whenever a class decision needs to be made, but you may also ask groups to report back more regularly, for example, at the beginning of each lesson. This will keep the momentum going and keep everyone in touch with the complete plan. Be prepared to offer back-up help to ensure that the information is presented clearly to everyone. It will help if you put key questions to the group to help it clarify its presentation. Make sure that someone records any decisions that are made.

If new jobs emerge from the ensuing discussion, you (or the job coordinator) may need to prepare some new 'Job cards'. You may need to add hints on the back.

⑩ When every job has been completed the class should check that nothing has been forgotten by talking through the whole trip from start to finish.

STAGE 3

Completing the 'Final plan' sheet

Each person in your group should fill in a copy of this sheet. It will help you to remember all the details for your trip.

11

Timetable for the trip

Where you will be and what you will be doing

Time	
12·00	· Meet
12 15	Arrive
12 30	· Trip
12 45	·
1 00	·
1 15	·

Other details
(For example, things to remember, directions for th...
phone numbers, details of meeting pl...

Final plan *(continued)*

Details of the trip
What we need to bring Clothes   *Kagoule*

Money   *£ 3 50*

Packed Lunch

Final plan

Name   *Yasmeen*
The class trip is to   *the Castle*
on (date)   *June 15th*

Names of everyone coming on the trip
Pam C
Rosemary B
Trevor S
Raju
Yasmeen
Sarah
Philips
Catherine

When you go on your trip, take your 'Final plan' with you.

22

11 While the plan is fresh in everyone's mind, each student should carefully complete a 'Final plan' sheet. This will help to ensure that everyone feels involved and knows exactly what will happen on the day of the trip. Encourage students to question each other if they are still unclear about any details. Each person should feel confident that she or he could run the trip by themselves.

Assessment tasks for Stage 3

There are seven tasks associated with this stage. Assessment tasks 1 to 6 may be attempted in any order and at any time during Stage 3. Assessment task 7 should already have been completed in the normal course of the work. These tasks may be used to assess whether or not a student can obtain and interpret

  (v) a telephone directory,

 (vi) aural and written timetables,

(vii) a street map,

(viii) a route map,

and can

 (ix) identify omissions in given information,

  (x) place jobs in a logical order,

 (xi) complete a clear and comprehensive final plan,

(xii) take an active part in the planning process.

Some suggestions on organising tasks 1 to 6

(It will be convenient to duplicate these tasks back to back to form eight-page A4 booklets.)

As four tasks require resources which will not be in plentiful supply (for example telephone directories), we suggest that, while students are working on Stage 3, you set these tasks up on four desks at the back of the room. (If you have duplicates of resources, then you could of course set up more desks for each.) Each desk should be clearly labelled:

The other two tasks may be worked on at a student's own desk – they need no resources
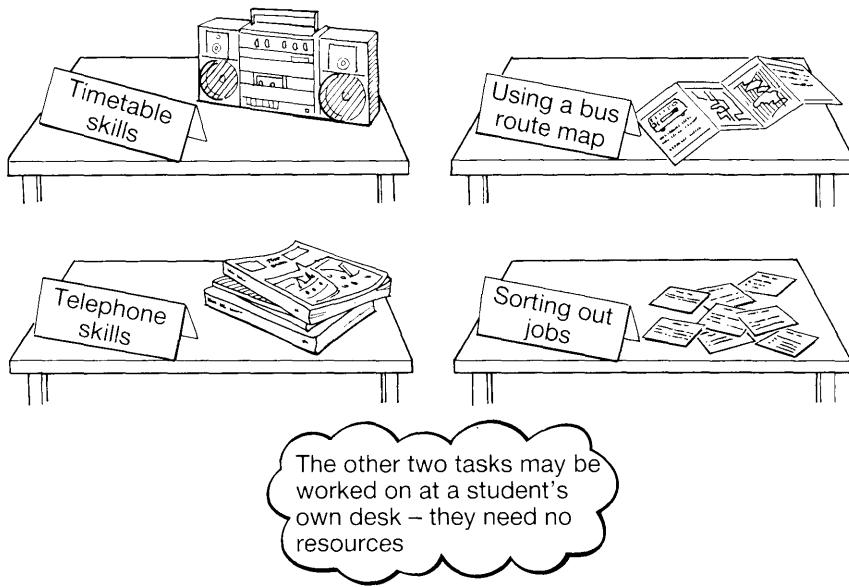
Whenever students are stuck for something to do, they can collect their assessment booklets from you, and you can then direct them to work individually on these tasks at the appropriate desks. When a student has finished a task, this can be recorded on the cover sheet and he or she may then either attempt a second task or return to Stage 3. In the latter case, the assessment booklet could be returned to you for safekeeping.

Stage 3 Assessment tasks

Name _____

Class _____

- This booklet contains six tasks.
- You can do them in any order and at any time during Stage 3.
- They do not need to be done at one sitting, but may be spread over several lessons.
- If you have finished a task and do not want to do another one straight away, *please return this answer booklet to your teacher.*

When you finish a task, put a tick against it below:

1. Telephone skills ☐

2. Timetable skills ☐

3. Using street plans ☐

4. Using a bus route map ☐

5. Asking for permission ☐

6. Sorting out jobs ☐

Notes for the teacher

Masters M25 to M32 should be duplicated back-to-back to form an 8 page booklet.

The following resources will be required:

Task 1. A copy of a local telephone directory* and a 'Yellow Pages'*.

Task 2. A pre-recorded tape of a 'British Rail' talking timetable, a cassette player* and a National Express coach service leaflet.

Task 4. A copy of the Nottingham City bus service route map.

Task 6. A set of 8 leisure centre job cards (see M33).

The items marked * are not included in the module package.

Please refer to page 40 in the Teacher's Guide for guidance on setting up these tasks.

Page 1

M25

Telephone skills

> You will need a copy of your local telephone directory and a copy of your local 'Yellow Pages'.

1. Suppose that you and 6 friends are planning a trip to the zoo. You want to telephone a few places to find out travel information. Look up the following telephone numbers and write them in the boxes.

Train

a) Local passenger train enquiries.   Number: [   ]

Bus

b) Local bus station, for times of buses which pass   Number: [   ]
    close to your school.

Taxi

c) A local taxi service. Write down the *name* of the   Name: [   ]
    taxi company as well.

                                                Number: [   ]

Mini-bus

d) A local mini-bus hire firm. (You only need a bus   Name: [   ]
    for 7 people.) Write down the name of the firm
    as well.

                                                Number: [   ]

2. Suppose that you also want to telephone the zoo. You know the address of the zoo, but the number is not in your phone book because it's too far away. Your friend suggests that you ring 'Directory Enquiries' to find the number.

Directory Enquiries

What number is 'Directory Enquiries'   Number: [   ]

3. Suppose that you want to ring a friend who is on holiday at a hotel in Cornwall. They have told you that the phone number is Falmouth 53839.

Hotel

What number should you dial?   Number: [   ]
(Give all 9 digits)

Page 2

M26

42

Timetable skills

You will need a tape recording of the British Rail talking timetable and a National Express coach service leaflet.

Imagine that you are planning a day trip to London for next Wednesday. You want to leave Nottingham as soon as possible after 9.00 am and you want to be back in Nottingham just before 6.00 p.m. You can go either by train or by coach.

Fill in this table to compare the two methods of transport.

	Listen to the tape to find out train times. (Turn the tape over for return times.)	Use the leaflet to find out coach times.

	Train	**Coach**
Nottingham to London (outward journey) What time would you leave Nottingham? What time would you arrive in London?		
London to Nottingham (return journey) What time would you leave London? What time would you arrive at Nottingham?		
How long would you have in London?		

Which method of transport would you prefer? _____

Why? _____

What other information would you need before making a decision?

_____

Page 3

M27

43

STAGE 3   ASSESSMENT TASK 3

Using street plans

You will need the Ayr maps.

1. Your family is on holiday near Stranraer in Scotland, and is planning to go to the swimming baths in Ayr.

   You are given these directions.

   > Go along the A77 road from Stranraer until you pass the golf course at Dalmilling. Then turn left at the next junction and carry on to the end of the road. Turn left, cross the bridge and then turn right. Take the second turning on your left and you'll see the swimming baths on your right.

   Show this route clearly on the two maps.

2. In the space below describe in words a shorter way of getting to the swimming baths from the A77 from Stranraer.

   Keep your instructions as simple as possible.
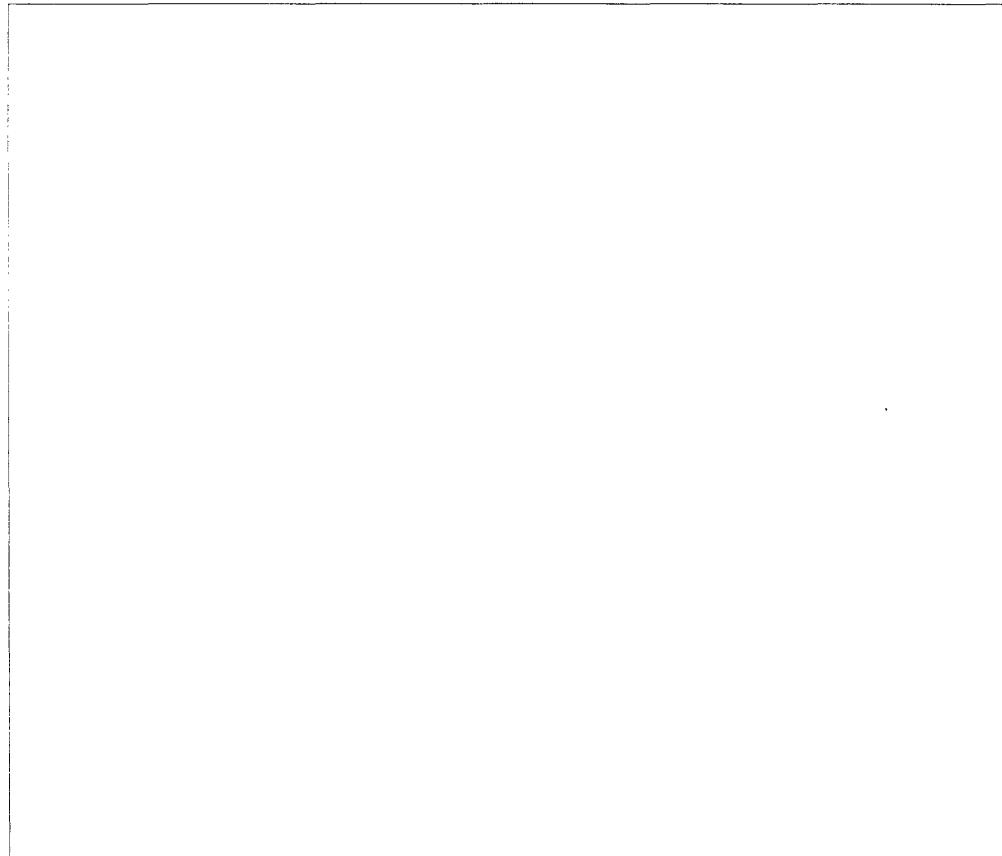
Page 4

M28

Solutions to question 2

Any route that is more direct than that given above is acceptable, for example "Turn left along the A79. Continue through the town to the end of the High Street, turn right then left and take the second left turning to the Esplande. The swimming baths will be on your right."

44

Map of Ayr

Ayr district ⟹

Ayr central area ⟱

See Plan of
Central Ayr

CENTRAL AYR

SCALE
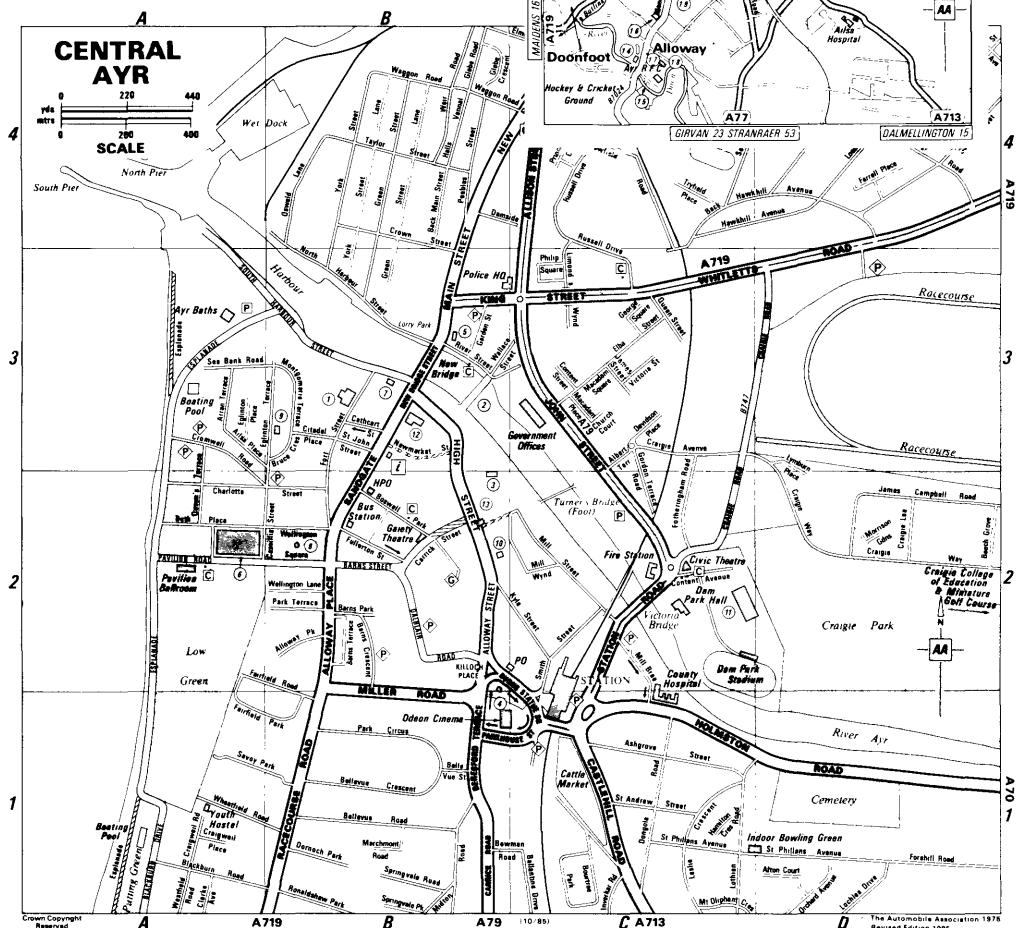
Maps reproduced from 'AA Town Plans' by permission of the Automobile
Association – Crown Copyright reserved

Page 5

M29

Solution to question 1

STAGE 3 ASSESSMENT TASK 4
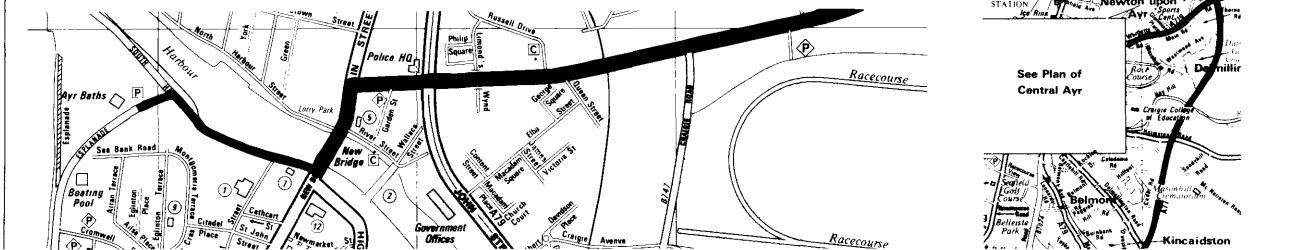
Using a bus route map

> You will need a copy of the Nottingham City Bus Services Route Map.

1. ■ Open up the map.
   ■ Right at the bottom you will find 'Farnborough Road' (in square B4).
   ■ Now find the roundabout which joins 'Southchurch Drive' to 'Farnborough Road'.
   ■ You should now be able to see a blue '53' in a red box (this red box shows that bus number 53 starts here).

   Starting at this terminus, trace the route of the 53 bus as it goes round Nottingham. As you do this, make a list showing all the roads it travels along. Use the space below.

   Number 53 bus route ...
   Corner of Farnborough and Southchurch Drive
   Southchurch Drive
   Farnborough Road (again!)
   Clifton Lane

2. Suppose that your aunt lives on Wollaton Vale, near Balloon Wood (A2). She has to go to the University Hospital (B3) for a check-up.

   Which bus could she catch? _____

   What route does the bus take? _____

   _____

   _____

   _____

Page 6

M30

Solution to question 1

Clifton Boulevard, Middleton Boulevard, Western Boulevard, Valley Road, Mansfield Road, Nottingham Road, Gedling Road, Rolleston Drive, Howbeck Drive, Killisick Road, Coppice Road.

Solution to question 2

Bus number 35. Wollaton Vale, turn left along Derby Road past Wollaton Park to the University Hospital.

Asking for permission

Imagine that *your* class is going on a trip to *your* local swimming baths next Tuesday morning.
One person has volunteered to write a letter to parents, asking for permission:

Dear Parent,
    We are going to the swimming baths
next Tuesday.

If _____ can go, please tick the box.

Reply slip (Tear off and return to school)

    I agree that he/she can go.

Make a list of all the important details that have been missed out of the letter.

A discussion of this task appears on page T81.

Sorting out jobs

You will need a set of 8 leisure centre job cards.

A class have chosen to go to a Leisure Centre for the morning.
Some want to go swimming, while others want to play table tennis, squash, badminton or snooker.
There are 3 leisure centres within a bus ride from their school.

They have written all the jobs that need to be done on cards.

Job E
Add up all the costs of travel an'
leisure centre activities.

Job A
Make a *firm* booking at the leisure centre.
This means that you *know for certain* that
you can go, and you want them to reserve
a space.

Job H
Provisionally book the leisure cen*
"¬at you're n¬*

Job G
¬ journey details
¬us to catch
¬me it leaves and returns
much it costs.

Ask permission f
¬rc This n

Job C
Work out how much money each p
will need to take.

*Tell the class what spo¬¬s are available
and decide which leisure centre to go to.*

Jc

¬ centres and find out
ble
ity costs

- Try to sort your job cards into order of priority.
  (Which job needs to be done first? second? third? and so on.)

- When you have done this, write down the jobs in order in the boxes below.
  (The first one has been done for you.)

1st	2nd	3rd	4th	5th	6th	7th	8th
↓	↓	↓	↓	↓	↓	↓	↓
B							

This means that job B must be done first.

Page 8

M32

Resource for assessment task 6

Cut out these 8 leisure centre job cards and use them in conjunction with M32.

Job A Make a *firm* booking at the leisure centre. This means that you *know for certain* that you can go, and you want them to reserve a space.	**Job E** Add up all the costs of travel and leisure centre activities.
Job B Phone up the 3 leisure centres and find out ■ what sports are available ■ how much each activity costs ■ when it is open.	**Job F** Tell the class what sports are available and decide which leisure centre to go to.
Job C Work out how much money each person will need to take.	**Job G** Find out all the journey details ■ which bus to catch ■ what time it leaves and returns ■ how much it costs.
Job D Ask permission from parents and teachers. This means telling them *all* the plans in detail.	**Job H** *Provisionally* book the leisure centre. This means that you're not absolutely sure that you can go, but you want them to reserve a space for a while.

M33

Stage 3   Assessment task 7

The 'Final plan' sheet

Each student should have completed a 'Final plan' sheet at the end of this stage (see page 22). This may be used to help in assessing criterion (xi).

Final plan

Name

The class trip is to

on (date)

Names of everyone coming on the trip

Other details

(For example, things to remember, directions for the route, important phone numbers, details of meeting places.)

STAGE 3

Final plan *(continued)*

Details of the trip

What we need to bring: Clothes

Money

Food

Other

Where we meet

When we leave school

When we get back

Which adults are coming with us

What we are going to do

How we will go

PLAN A TRIP
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STAGE 3

Timetable for the trip

Time	Where you will be and what you will be doing

M11

PLAN A TRIP
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Stage 4   Going on your trip and evaluating it

Introduction

In this final stage, the trip takes place and then students compare what actually happens with what they had anticipated would happen. They are then asked to suggest ways in which the planning and running of the trip might have been improved.

Total time needed

The evaluation should occupy between ½ and 1 hour.

Organisation and equipment required

The class is responsible for the organisation and equipment for the actual trip.

For the evaluation each student will need a copy of an 'Evaluating your own trip' sheet.

Stage 4   Going on your trip and evaluating it
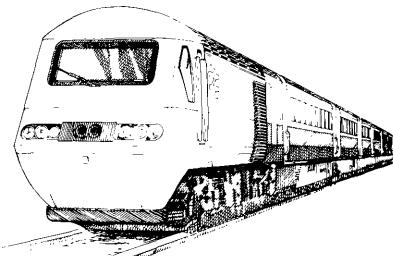
Now that all the plans have been made, you can go on your trip . . .

. . . and compare what you *thought* would happen with what *actually* happens.

You may like to keep a record of your trip by taking some photographs.

23

Related assessment criterion

This stage offers students the opportunity to show that they can
(xiii) evaluate the plan which has been implemented.

STAGE 4

After the trip

Think back over the trip and talk it through with your friends.
Using an 'Evaluating your own trip' sheet, note down

- what really happened, including times and costs
- the things that were good about it
- the things that went wrong, or that were different to your plan.

Evaluating your own trip
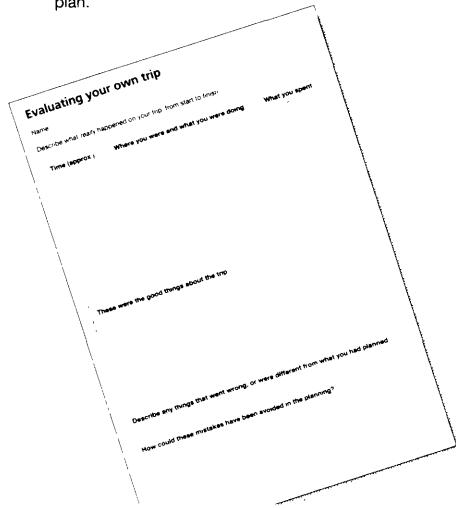
Now that you have planned one trip, you may like to plan something more ambitious . . .

24

During the trip, it would be useful if some students could record what happens, perhaps by taking photographs and recording the times at which these were taken. This will facilitate a more accurate evaluation.

After the trip, students should be asked to analyse the differences between the actual trip and their plan. In particular, they should try to remember costs and approximate times when events occurred. (Perhaps someone could make a poster with the photographs that were taken – arranging them into sequential order and labelling them with times.)

It is important to be able to distinguish things that went wrong because of bad planning from those that were merely the result of unavoidable circumstances.

Assessment task for Stage 4

The 'Evaluating your own trip' sheet

The completion of this sheet will help you when deciding whether or not a student can

(xiii) evaluate the plan which has been implemented.

This task should have been completed within the normal course of the work.

STAGE 4

Evaluating your own trip

Name _____

Describe what really happened on your trip, from start to finish.

Time (approx.)	Where you were and what you were doing	What you spent	

These were the good things about the trip . . .

Describe any things that went wrong, or were different from what you had planned.

How could these mistakes have been avoided in the planning?

M34

PLAN A TRIP
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Some possible further developments

The theme of 'Plan a Trip' leads naturally to development in many ways.

- Students may now enjoy the challenge of planning more ambitious trips. These may be trips which they intend to go on (e.g. the youth hostelling holiday mentioned in the interview on page T95), or which are imaginary but intriguing (e.g. a trip around the world or a comparison between a holiday to Great Yarmouth and a holiday to Ibiza (see below)).

- The planning experience gained may motivate a number of projects associated with the trip context (e.g. the organisation of a sponsored walk or the preparation of local youth-centred tourist information (see below)).

- Students may wish to transfer and develop their planning skills to a new context (e.g. the planning and running of a party or disco).

- You, or the students, may wish to use the module theme as a starting point for more involved problems or investigations, encouraging the development of mathematical techniques. This is explored in Chapter 3.

Three of these ideas are now discussed in a little more detail.

Comparing two holidays

> Three friends and their parents are involved in trying to choose between a 10-day caravan holiday in Great Yarmouth and a cheap 10-day package holiday to Ibiza. Obtain some holiday brochures and help them to make an informed decision. Estimate the total cost of the holidays. (Include entertainment, clothes and food etc. as well as travel and accommodation costs.)

Often, mathematical problems associated with holiday travel concentrate solely on the costs of travel and accommodation, but there are many other costs associated with holidays. If these are excluded from any calculations (because, for example, they cannot be determined exactly) then the solution may become unrealistic. (When this problem was tackled by three students they were surprised to discover that the costs of the two holidays were not as different as had been anticipated!)

Organising a sponsored walk

> Suppose that you decide to raise money for charity by organising a sponsored walk in your area.
>
> Plan how you would do this and, if possible, put your plan into action.

Organising such an event requires many of the skills already used in 'Plan a Trip'. In addition, aspects of the problem which a group will probably need to consider include

   (a) agreeing on the objectives of the walk,

   (b) deciding on and maintaining effective organisation,

   (c) maximising income,

   (d) maintaining safety,

(e) selecting and testing a suitable route,

(f) estimating all the costs involved,

(g) following any rules and regulations.

Job (a) might well involve a survey among possible participants, whilst (b) will call upon the listing and sequencing skills used in Stage 3. The total income obtained (c) is likely to depend on the average participants' cash collection from sponsors, the number of participants, and the organising costs (f). In turn, the cash collections are likely to depend on a variety of factors, including the perceived 'worth' of the cause, the motivation of the participants, the effectiveness of advertising and enlisting of participants, as well as the location and timing of the event. Often, events which are very demanding (and only open to a few participants), or which are seen as trivial (and unattractive to potential donors), are less profitable than those which require a modest achievement from a fairly large number of participants. The selection and testing of a suitable route and the location of checkpoints to fit agreed time and safety constraints, require the ability to make reasonable estimates of time and speed, as well as the ability to interpret maps.

Preparing a local tourist leaflet

Devise and produce a tourist leaflet for your town which is aimed at the teenage visitor. This will involve finding out and then displaying a variety of local information, including

- bus services, (different firms, times, route maps, fares)
- walking distances and times
- details of main attractions in the area
- suggested excursions, tourist trails etc.

Your group will then have to agree on how best to display the information from the visitor's point of view.

Find a way of mass-producing your leaflet. You may like to use a typewriter, word processor, or even a local printer. (Estimate the costs of this.)

This task may include

- conducting a survey to ascertain what are seen as the main attractions of the area and the kind of information that would prove particularly useful to a teenager
- producing a scale map of a local area, maybe using an Ordnance Survey map as a basis
- calculating costs, distances and travel times
- the utilisation of photographic, graphic and other art skills. (Perhaps this could involve the collaboration of teachers from other departments.)

Developing the mathematics

Developing the mathematics

Introduction

While students are working on this module, their main objective is to devise a well-organised and interesting trip – not to develop particular mathematical techniques. You may, however, wish to use the opportunities provided by the module to motivate the learning of mathematics in a more explicit way. This chapter offers a few ideas on how this may be achieved without destroying the essential flow of activities contained in the module.

Which skills may be developed?

The table below illustrates a few of the mathematical topics that can be related to the context of this module. This list is not intended to be exhaustive because different trips will require different techniques in their planning. An afternoon trip to the local leisure centre will make different mathematical demands on students than, say, a day trip to France.

Some mathematical topics	Examples in the context of the module
Money	
■ Carrying out simple monetary transactions in theory and practice	Calculations carried out in 'The Matlock Bath Game', or during the trip itself.
■ Estimating costs.	Producing a rough costing for a proposed trip on the 'Ideas leaflet'.
Time	
■ Understanding and using both 12 and 24-hour clocks.	Reading bus and train timetables.
■ Producing a schedule.	Drawing up a timetable for the day of the trip on the 'Final plan' sheet.
Measurement	
■ Understanding and using everyday measures of distance, time and speed.	Using maps to calculate journey times.
Percentages	
■ Understanding simple discounts expressed as percentages.	Railcard discounts, and other party discounts are often expressed in this way.
Graphical and other representations	
■ Extracting information presented in written, tabular or diagrammatic form.	Using tourist information leaflets, timetables, route maps etc.
■ Organising systematically the collection and presentation of data.	Organising a 'Jobs schedule', filling in 'Job done' cards and reporting back to the class.
Logic	
■ Inventing and following a set of instructions.	Completing and using the 'Final plan' sheet.
■ Arranging tasks into a logical order.	Sorting out 'Job cards' into order of priority. Coordinating the completion of the jobs.
Statistics	
■ Conducting a simple survey and making decisions based on the outcome.	Devising a voting system and using it to decide on a suitable destination for the trip.

How and when may they be introduced?

Mathematical activity may be initiated either by the student or by the teacher. For example:

- A group of students may become aware of its need to acquire a particular skill in order to carry through its own plan. 'How do you use this timetable, Miss?'

- You may wish to use a part of the module to support a more intensive piece of work on a particular topic. 'Today we are going to look at voting systems. Can you remember how you voted on the best place to go for your trip?'

The first type of situation can lead to an invaluable learning experience because the student wants to know something. Such opportunities occur rather unpredictably, however, and it is inadvisable to spend a great deal of time helping one group if you have a large class to supervise. One possible solution is to ask a member of the group to describe the group's problem to the whole class and invite help and advice from other students. Another possibility is to use existing material to help develop some simple 'How to . . .' sheets. For example, the few pages at the beginning of the British Rail Timetable give a full explanation of how to read train timetables. If this presentation proves too difficult, a simplified version could be developed for classroom use.

Do not expect students to use, autonomously, mathematics that they have only recently been taught. There is a gap, typically of several years, between first 'learning' a skill and being able to use it with flexibility and fluency. Students will tend only to use skills that they have mastered. Narrowing this gap requires a more 'rounded' approach to learning, with a variety of applications and non-routine problem solving to supplement and give meaning to technical exercises.

Teacher-initiated work on mathematical techniques relating to the theme may occur *before*, *during*, or *after* working on the module.

Before: 'I'll do some work on ratio now, and then my class will be able to use the map scales later on, when they start work on the module.'

This timing has the advantage that the student will, if all goes well, have their techniques polished and ready to be used, but it does seem artificial to learn a new technique before seeing a need for it. Students may tend to assume that the module is merely a vehicle for practising some specific techniques, rather than to develop their autonomy in problem solving.

During: 'They seem to be having some difficulty in interpreting the 24-hour clock. We'll take a break from the module for a few lessons and practise this skill.'

'I'll prepare some problems sheets for my class so that I can keep them together. So if one group finishes a stage early, they can do problem sheets until the rest of the class have caught up'.

This timing enables you to respond to needs as they arise, but if students always expect you to produce the method or solution when the going gets difficult, you may reinforce dependence and undermine autonomy. If this is done too often on a class basis then the work on the module may tend to drag on over many weeks and becoming boring.

After: 'When we finish the module, we will look at the techniques we have used in more depth.'

The experience of working on the module may motivate and enable students to perceive the value of techniques when they are taught. Students may still not be able to use techniques autonomously unless they are given further opportunities to apply them in real problem solving contexts.

Whatever you decide, it is important to be vigilant about preserving the students' strategic control of their work on the module; it is too easy to allow them to revert to the imitative roles that the traditional curriculum encourages.

On the following pages we offer a few ideas for developing mathematical tasks on the 'Plan a Trip' theme. We have not included examples which are already adequately covered in many textbooks (for example, using timetables, maps, and holiday brochures.) In their present form, the following ideas may be too open or too difficult for some students and may need some further development before you can use them. We hope that they stimulate some more ideas of your own.

Some sample ideas

Voting systems

Ten people are trying to decide where to go for a day out. They have four destinations to choose from: a castle, a theme park, a zoo and a museum. To begin with, each person ranks the 4 places in order of preference:

	John	Sue	Malcolm	Barbara	Rajiv	Hugh	Jenny	Judith	Rosemary	Alan
Castle	1	2	2	2	3	2	1	4	3	4
Theme Park	4	4	1	4	4	1	3	3	1	1
Zoo	2	1	4	1	2	4	4	1	2	2
Museum	3	3	3	3	1	3	2	2	4	3

(Thus, Sue has put down the museum as her third choice, and so on.)
Where should they go? How do you decide?

At the end of Stage 2, students may experience difficulties in reaching an agreed decision on a destination for their trip and it may therefore be worth spending time in the discussion of decision-making processes.

One approach is to study the effects of different voting procedures on outcomes given the same input data. Students could be asked to suggest possible methods. The following are examples.

- Choose the place with the most first choices.

- Choose the place with the fewest fourth choices.

- Add up the rankings and choose the place with the lowest total.

- Eliminate the place with the fewest first choices, then ask everyone to vote again on the remaining destinations. Repeat this process until there is only one place left.

(It is interesting to note that, with the above data, the first three of these methods result in different decisions while the fourth remains inconclusive.) Students could also be asked to

- construct arguments for *choosing* each of the four alternative places

- construct arguments for *rejecting* each of the four alternative places

- suppose that the people were able to run *two* of the four trips.

  One method for choosing is to add the rankings and choose the two places with the two lowest totals.

  (This process results in a very poor decision being made. What goes wrong? Which two places should have been chosen? Why?)

Further extensions are possible with this theme. General elections may be explored, together with issues such as proportional representation.

Timetables

The Ffestiniog Railway
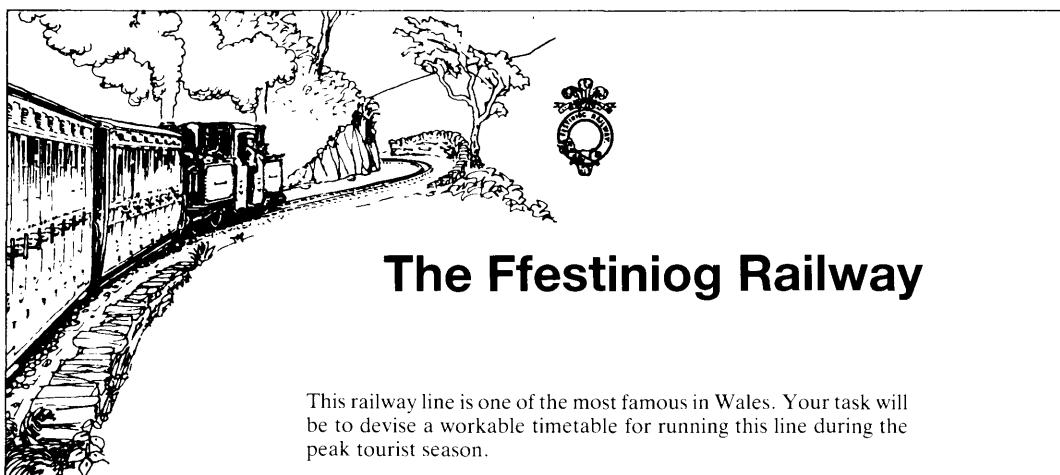
This railway line is one of the most famous in Wales. Your task will be to devise a workable timetable for running this line during the peak tourist season.

The following facts will need to be taken into account:

● There are 6 main stations along the 13½ mile track:
(The distances between them are shown in miles)

Porthmadog

Penrhyn

Tan-y-Bwlch

Tanygrisiau   1¼

Blaenau Ffestiniog

2
Minffordd   1¼   4¼   4¾

● Three steam trains are to operate a shuttle service. This means that they will travel back and forth along the line from Porthmadog to Blaenau Ffestiniog with a 10-minute stop at each end. (This should provide enough time for drivers to change etc.)

● The three trains must start and finish each day at Porthmadog.

● The line is single-track. This means that trains cannot pass each other, except at specially designed passing places. (You will need to say where these will be needed. You should try to use as few passing places as possible.)

● Trains should depart from stations at regular intervals if possible.

● The journey from Porthmadog to Blaenau Ffestiniog is 65 minutes (including stops at intermediate stations. These stops are very short and can be neglected in the timetabling).

● The first train of the day will leave Porthmadog at 9.00 a.m.

● The last train must return to Porthmadog by 5.00 p.m. (These times are more restricted than those that do, in fact, operate.)

While planning their trip, students may have found it necessary to interpret several bus and train timetables. They may have wondered how such timetables are constructed and some may enjoy the considerable challenge of inventing a timetable for themselves. Often, a graphical solution is the quickest and most accessible. For the above problem, for example, a student could begin by drawing a distance-time graph for the 9.00 a.m. train leaving Porthmadog, accurately showing

- the outward journey from Porthmadog to Blaenau Ffestiniog
- the waiting time at Blaenau Ffestiniog
- the return journey from Blaenau Ffestiniog to Porthmadog
- the waiting time at Porthmadog . . . and so on.

The other two trains may then be regularly spaced between successive departure times for this train. This will result in the following graph, from which a timetable may be constructed.

Bl. Flestiniog — 13
Tanygrisiau — 12
11
10
9
8
Tan-y-Bwlch — 7
6
5
4
Penrhyn — 3
Minffordd — 2
1
Porthmadog

Distance from Porthmadog (miles)

0900 1000 1100 1200 1300 1400 1500 1600 1700

Time of Day
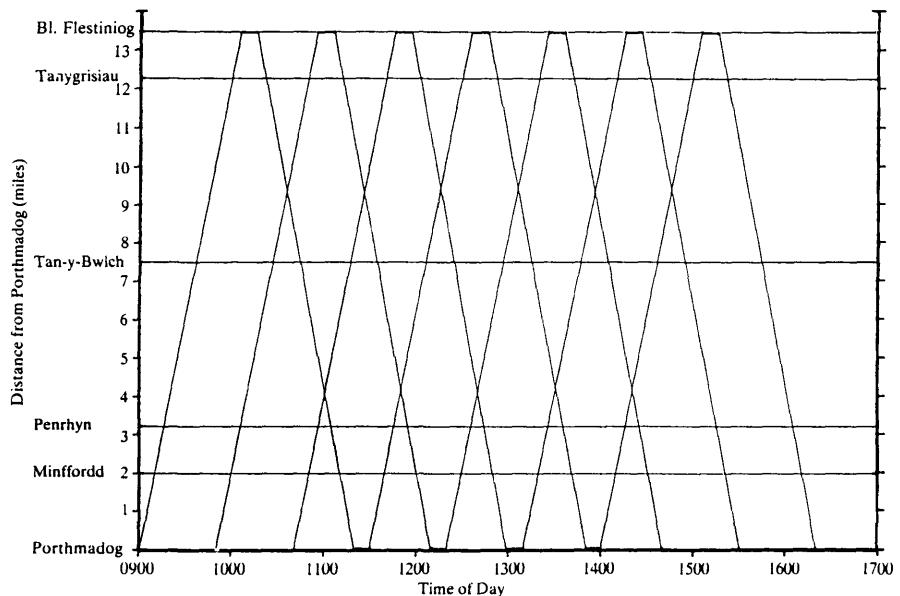
Miles	Station		Daily Timetable						
0	Porthmadog	d	09:00	09.50	10.40	11.30	12.20	13.10	14.00
2	Minffordd	d	09.10	10.00	10.50	11.40	12.30	13.20	14.10
3¼	Penrhyn	d	09.15	10.05	10.55	11.45	12.35	13.25	14.15
7½	Tan-y-Bwlch	d	09.35	10.25	11.15	12.05	12.55	13.45	14.35
12¼	Tanygrisiau	d	10.00	10.50	11.40	12.30	13.20	14.10	15.00
13½	Blaenau Ffestiniog	a	10.05	10.55	11.45	12.35	13.25	14.15	15.05
0	Blaenau Ffestiniog	d	10.15	11.05	11.55	12.45	13.35	14.25	15.15
1¼	Tanygrisiau	d	10.20	11.10	12.00	12.50	13.40	14.30	15.20
6	Tan-y-Bwlch	d	10.45	11.35	12.25	13.15	14.05	14.55	15.45
10¼	Penrhyn	d	11.05	11.55	12.45	13.35	14.25	15.15	16.05
11½	Minffordd	d	11.10	12.00	12.50	13.40	14.30	15.20	16.10
13½	Porthmadog	a	11.20	12.10	13.00	13.50	14.40	15.30	16:20

(It is also worth noting that two passing places are needed, approximately 4.2 and 9.4 miles from Porthmadog.)

It is interesting to compare the timetable produced in this way with a real one, an extract of which is given below.

Porthmadog d.	0840	0950	1035	1125	1220	1310	1400	1455	1545	1635	1900

British Rail Pwllheli d.
Cambrian Coast line Minffordd a. 0755 | 0938 | 1135 | 1400 | 1500 | 1640
See notes below 0825 | 1205 | 1433 | 1530 | 1710
NO SUNDAY Barmouth d. 0817 | 1008 | 0955 | 1155 | 1343 | 1520 | 1752
SERVICE Minffordd a. 0901 | 1040 | 1237 | 1422 | 1606 | 1834

Minffordd d.	0849	0959	1044	1134	1229	1319	1409	1504	1554	1644	1909
Penrhyn d.	"Early	1005	1050	1140	1235	1325	1415	1510	1600	1650	1915
Tan-y-Bwlch d.	Bird"	1025	1112	1205	1255	1345	1435	1530	1620	1710	1935
Tanygrisiau d.		1043	1135	1223	1313	1407	1458	1548	1641	1728	1953
Bl. Ffestiniog a.	0940	1055	1146	1233	1325	1417	1507	1600	1652	1740	2005

Bl Ffestiniog d 0945 | 1105 | 1330 | 1450 | 1625 | 1748 | 2020
British Rail Llandudno Jcn a 1042 | 1204 | 1431 | 1548 | 1726 | 1845 | 2117
Conwy Valley line Llandudno a 1055 | 1214 | 1441 | 1558 | 1903 | 1903 | 2127
See notes below Llandudno d 0830 | 0950 | 1110 | 1333 | 1450 | 1630 | 1745
NO SUNDAY Llandudno Jcn d 0840 | 1000 | 1121 | 1343 | 1501 | 1640 | 1803
SERVICE Bl Ffestiniog a 0940 | 1100 | 1224 | 1445 | 1609 | 1741 | 1903

Bl. Ffestiniog d.	1015	1105	1155	1245	1340	1430	1520	1615	1700	1746	2015
Tanygrisiau d.	1021	1111	1201	1251	1346	1436	1526	1621	1706	1752	2021
Tan-y-Bwlch d.	1045	1133	1225	1315	1405	1500	1550	1640	1730	1814	2043
Penrhyn d.	1101	1149	1245	1335	1424	1520	1606	1659	1746	1830	2059
Minffordd d.	1106	1154	1250	1340	1429	1525	1611	1706	1751	1835	2104

British Rail Minffordd d 1205 | 1433 | 1530 | 1710 | 1955
Cambrian Coast line Barmouth a 1246 | 1514 | 1616 | 1751 | 2036
See notes below Minffordd d 1237 | 1422 | 1606 | 1834 | 2212
NO SUNDAY Pwllheli a 1305 | 1450 | 1633 | 1901 | 2239
SERVICE

| Porthmadog a. | 1120 | 1209 | 1304 | 1354 | 1444 | 1539 | 1629 | 1719 | 1805 | 1848 | 2117 |

63

Networks

The 'Tour of Britain' project
You will need a copy of the AA Members Handbook, or a similar resource, which gives details of accommodation, mileage charts and maps.

Imagine that you own a coach company in your home town, and that it is your job to organise a one week coach tour of Britain, visiting at least 7 of the towns shown on the map.

Choose the towns that you think would appeal to foreign tourists.

Sketch a network showing the distances between these towns and find the shortest route by which you could visit each of them and return home.

Estimate how long each of your journeys will take (assuming an average speed of 40 mph) and draw up a rough timetable for the tour. Allow plenty of time for sightseeing.

Choose your overnight stops, and try to find reasonable but cheap accommodation. Make estimates of the driver's wages, petrol costs and other expenses. Calculate the cost per passenger (assume there are 50 tourists) which would enable you to 'break even'.

Produce a brochure advertising the tour.

This project idea begins with an open-ended version of the 'Travelling Salesman' problem. Suppose that the coach firm is based at London, and that the 7 towns selected are London, Plymouth, Edinburgh, Nottingham, Liverpool, Cambridge and Norwich.

The network which results is shown below.
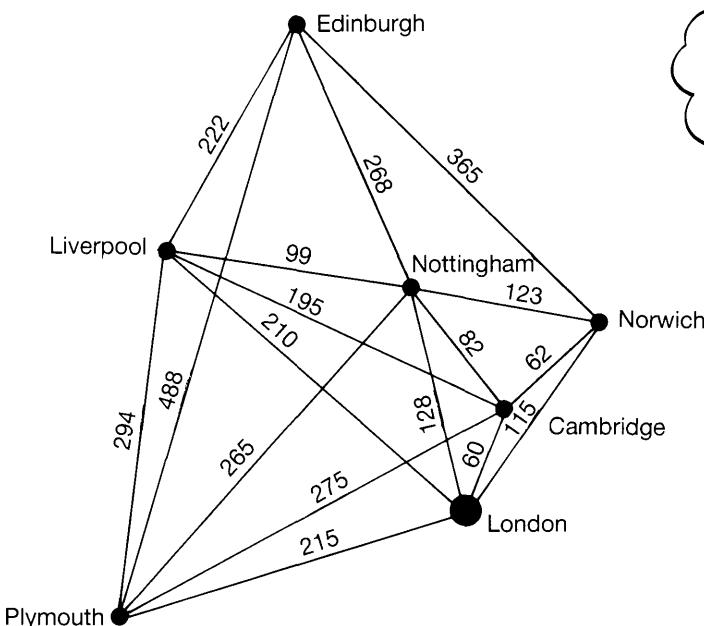
Distances are given to the nearest mile and are measured along the AA recommended routes.

No general algorithm for finding the minimum distance around such networks is known, apart from enumerating all the possible routes. (In this case, however, this is not too difficult.) If there are n towns, there are at most $\frac{(n-1)!}{2}$ possible routes, and for even moderate values of n this number of possibilities is too large to handle on the most powerful computers*.

The remaining activities may be made as realistic as the student wishes. Additional data, such as the fuel consumption of a coach, may either be estimated or researched via a few letters or telephone calls. The final report may prove suitable for assessment as GCSE coursework.

Shopping

You arrive by bus in the centre of a nearby town at 10 o'clock and have to catch a bus from the bus station at 11.30.

You've noted down what you want to do in the time.
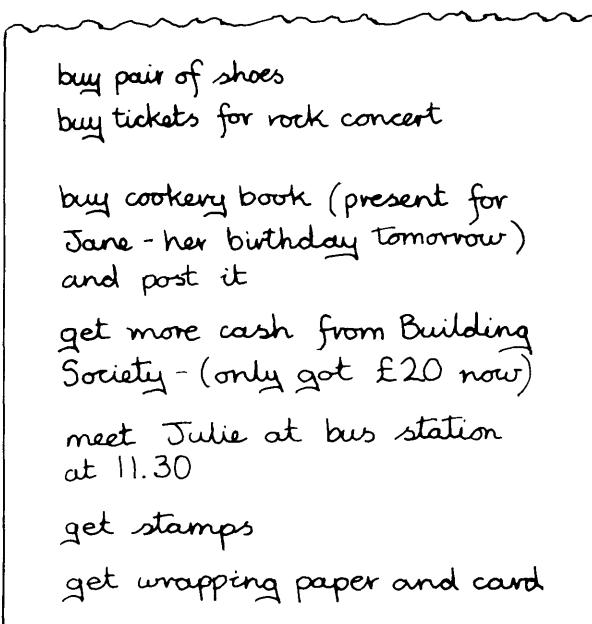
buy pair of shoes
buy tickets for rock concert

buy cookery book (present for Jane - her birthday tomorrow) and post it

get more cash from Building Society - (only got £20 now)

meet Julie at bus station at 11.30

get stamps
get wrapping paper and card

Plan the best route and timetable you can, to carry out these tasks. Make sure you allow reasonable time for walking from place to place as well as for shopping.

Your students will need a scale map of a real or fictitious town centre, showing a variety of shops and other locations.

You will be able to devise a range of problems of a similar sort, using the same map.

Your students may also enjoy making up such problems and giving them to each other to solve.

* (Students may like to compete against a computer in finding the shortest route around 10 towns of their choice, using the program SALESMAN. See, Teaching with a Micro, Maths 1, Shell Centre for Mathematical Education, University of Nottingham 1984. ISBN 0 906 126 223.)

Critical path analysis

Six teenagers are planning a weekend trip, starting on May 30th, to a youth centre for their youth club. They have made the following list of essential jobs, together with approximate times, within which each job should be done.

Job	Time allowed
(A) Telephone a few coach firms, get quotes, choose the best and confirm the booking in writing. Wait for and receive a reply.	14 days
(B) Plan the menus.	5 days
(C) Work out a detailed timetable for the weekend and write out dormitory lists, washing up rotas and so on.	7 days
(D) Discuss the idea of the weekend with the youth club members and get a rough idea of the number interested in going.	8 days
(E) Go and visit the Centre to check on the facilities (for activities, cooking, sleeping etc) that are offered.	10 days
(F) Plan the various activities that will take place and collect together all the necessary items of equipment.	14 days
(G) Make a provisional booking for the Centre, pay a deposit and receive confirmation.	20 days
(H) Notify the Centre of the final numbers that are going.	1 day
(I) Type out an information leaflet about the weekend (including dates, times, travel details, costs, planned activities and a description of the place). Issue the leaflet to the youth club members, collect replies and the money.	14 days
(J) Go on the trip and pay all outstanding bills.	3 days
(K) Buy food.	2 days

Draw a network to show a logical order for doing these jobs. (Remember that some of the jobs can be done at the same time by different people.) Find out the minimum time that will be needed for doing all the jobs, and the latest day by which each job must be finished.

Although we have given this problem the rather daunting title of 'Critical path analysis' it should not be assumed that students need a formal knowledge of this subject before they can attempt to solve the problem. Each job could be written as a card and the cards rearranged physically, thus enabling an interesting and worthwhile group discussion to take place. A possible solution is shown below.
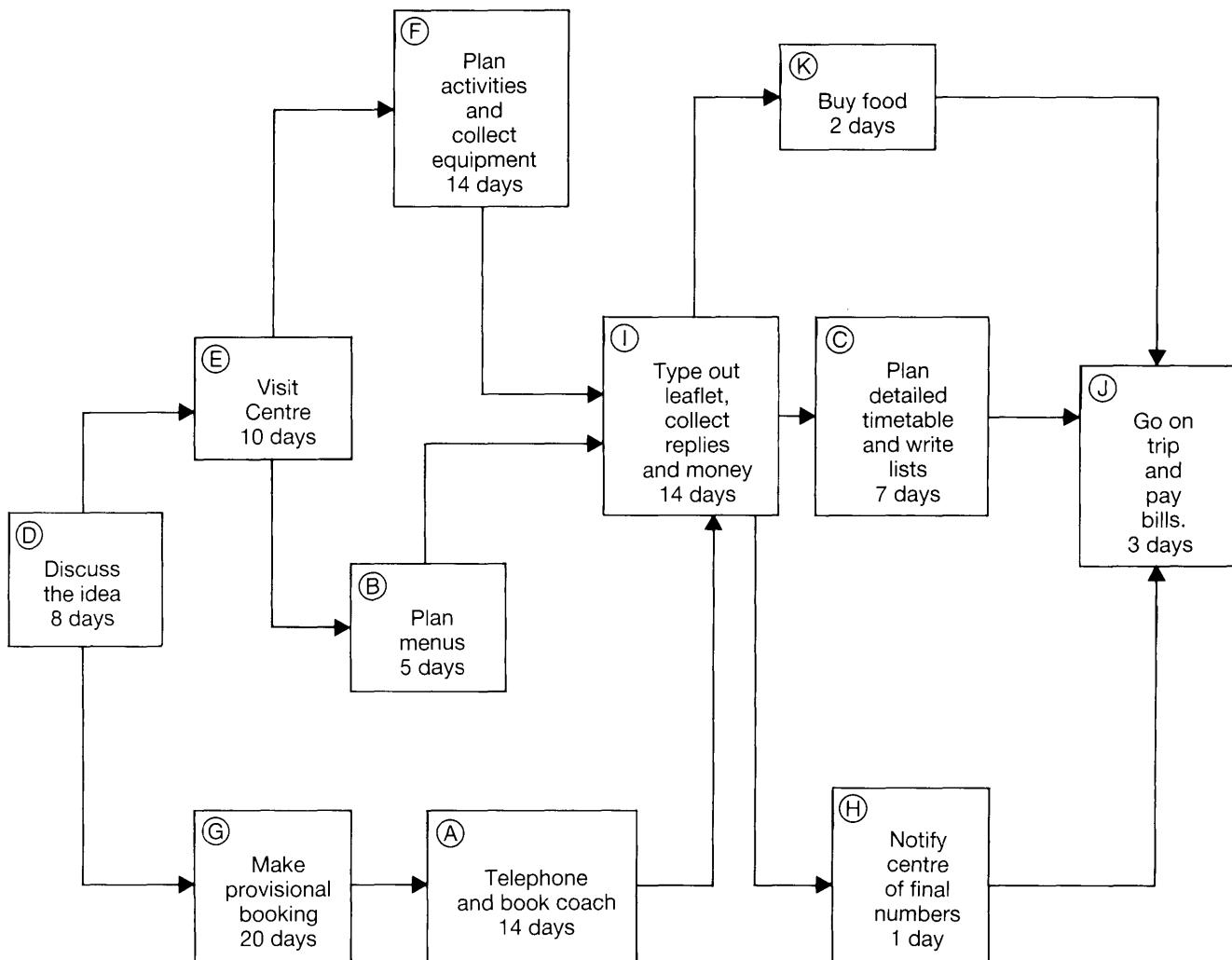
The minimum time for completing the jobs is thus 66 days. Working backwards along the network, each job may now be given a date by which it must be completed.

The above technique has many applications in industry and commerce. Students may enjoy the challenge of using similar techniques to plan one of the following projects.

- Moving house.

- Putting on the school play.

- Building a house (or a doll's house).

- Cooking Sunday Lunch.

- Decorating a room.

(For further discussion of critical path analysis see, for example, 'Decision Mathematics' by the Spode Group, Oxford International Assessment Services Ltd and Ellis Horwood Ltd 1986 ISBN 0-7458-0078-5.)

Maps

On a map you can usually tell how far away a place is, and in which direction you should travel to get there, but you cannot tell how long your journey will take nor how much it will cost. Here is one method for drawing a 'train times map' measured from your town.

■ Using an atlas trace the positions of your town and some major cities and coastal towns onto a sheet of paper.

■ From a timetable, find out the shortest time it will take you to get from home to each of these places.

■ Using a suitable scale (e.g. 2 cm represents 1 hour) 'move' the towns and cities directly towards or away from your town (keeping the same bearing), until their positions correspond to the journey times.

■ Sketch in a 'coastline' of Britain through the new positions of your coastal towns.

■ Add as many further details to your map as you feel necessary.

Compare your map with a similar one showing train fares. Which routes are the best value for money?

This activity produces a topological distortion, like the one drawn below, which illustrates travel times from London.

Normal 'Distance' map
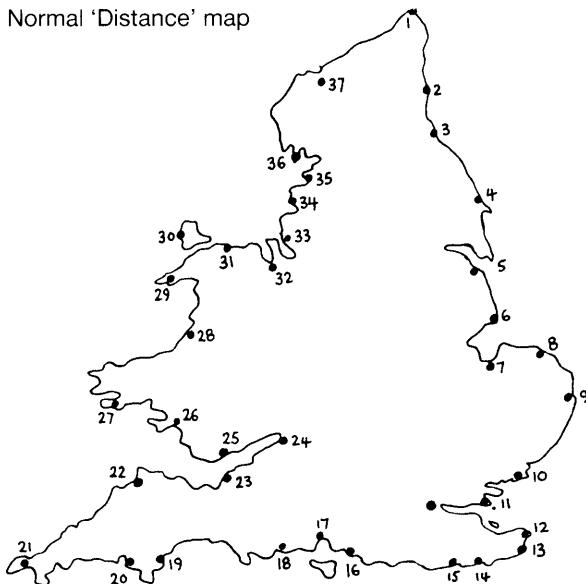
'Times from London' map
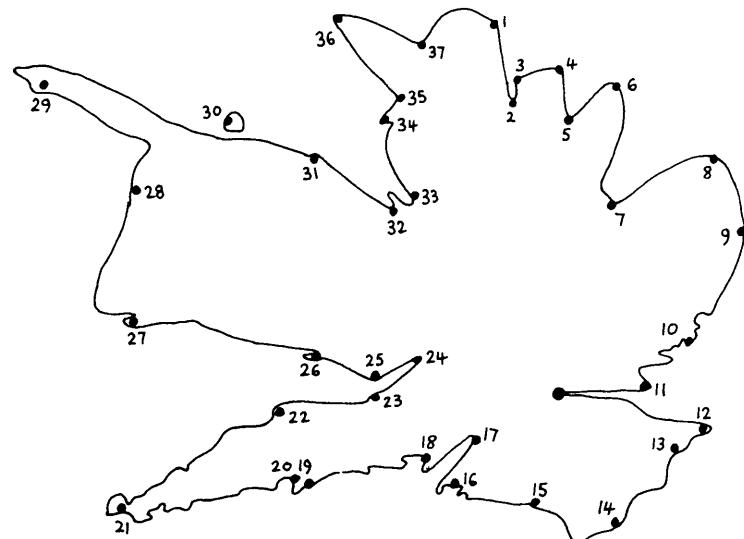
Number	Place	Time	Number	Place	Time
1	Berwick-upon-Tweed	4h 3m	20	Plymouth	3h
2	Newcastle-upon-Tyne	3h 10m	21	Penzance	4h 52m
3	Hartlepool	3h 26m	22	Barnstaple	3h 3m
4	Scarborough	3h 32m	23	Weston-Super-Mare	2h
5	Grimsby	2h 53m	24	Gloucester	1h 33m
6	Skegness	3h 25m	25	Cardiff	2h
7	Kings Lynn	2h 5m	26	Swansea	2h 40m
8	Cromer	3h 2m	27	Pembroke	4h 41m
9	Great Yarmouth	2h 40m	28	Aberystwyth	5h 5m
10	Clacton	1h 30m	29	Pwllheli	6h 30m
11	Southend	0h 55m	30	Holyhead	4h 40m
12	Margate	1h 37m	31	Colwyn Bay	3h 40m
13	Dover	1h 23m	32	Chester	2h 40m
14	Hastings	1h 30m	33	Liverpool	2h 41m
15	Brighton	1h 10m	34	Blackpool	3h 32m
16	Portsmouth	1h 30m	35	Morecambe	3h 36m
17	Southampton	1h 3m	36	Barrow	4h 44m
18	Bournemouth	1h 38m	37	Carlisle	4h
19	Torquay	2h 58m			

Students may like to draw similar time maps for bus or undergound train networks for their own localities.

Optimisation

Where do you locate your headquarters?

A new national organisation concerned with life in the countryside was recently faced with the problem of where to locate its headquarters. Staff would be required to travel to branches throughout England and to return, if possible, on the same day either by car or train. Branch representatives would need to be able to travel, usually by train to the headquarters for meetings, also returning home on the same day.

An analysis of train times was carried out for a selection of possible locations (see below).

■ Investigate the suitability of each different location, using further data as well as that given.

■ Try to select the two best locations, giving reasons for your choices.

You may find maps and mileage charts provided by the AA or RAC of use. A reasonable assumption for speeds is that cars can travel at an average speed (including stops) of 60mph on motorways and 40mph on other roads.

to \ from	London				Birmingham				Newcastle				Carlisle				Norwich				Southampton				Plymouth			
	a	d	f	t	a	d	f	t	a	d	f	t	a	d	f	t	a	d	f	t	a	d	f	t	a	d	f	t
Cheltenham	0830	2100	13	2¼	0800	2230	12	1	1200	1900	9	4	1200	1800	6	6	1200	1800	6	6	1000	1830	8	3	1000	1930	8	3
Rugby	0800	2130	23	1	0630	2300	20	¾	1130	1700	7	4½	1100	1730	6	5½	1030	1800	8	5	0830	2100	12	2½	1230	1900	10	5½
Stafford	0930	2030	23	1	0700	2130	28	¾	1130	1800	12	5	0900	2000	10	3	1030	1700	7	4¾	1030	1830	12	4	1130	1800	6	4¾
Leicester	0830	2200	30	1¼	0700	2200	14	1½	1030	1830	7	3¾	1030	1830	8	4	0930	1930	7	3	1030	1930	10	3½	1230	1730	6	5¼
Peterborough	0630	2230	32	1	0800	2030	11	2¼	0800	2100	20	2½	1230	1900	8	4½	0800	2100	9	2	0930	1900	20	3	1130	1830	8	5½
Derby	0930	2130	19	1¾	0730	2100	20	¾	0930	1930	9	3	1100	1800	8	5	1100	1800	7	3½	1100	1830	10	4	1130	1730	8	4½

Branch locations — Possible location of headquarters

a earliest arrival time (approx)
d latest departure time to return to base by midnight (approx)
f number of trains per day in each direction
t average journey time in hours

(These figures were obtained from a 1986 British Rail timetable)

At the time of writing, the organisation (ACRE) has yet to decide on the permanent location for its headquarters, but appears to have rejected Peterborough (which might seem to be a good choice) for somewhere between Cheltenham and Swindon. The actual analysis involved the consideration of 9 further locations in addition to the 6 shown here.

There were many other factors not directly concerned with travel which had to be taken into account. For instance, the personal preferences of key staff, the existence of suitable property for rental and other housing considerations.

Maybe this illustrates that mathematical analysis often serves to clarify issues, but that ultimate decisions may depend on human non-mathematical considerations. However the analysis certainly helped to indicate where *not* to locate the headquarters. Possible areas such as Salisbury, Sheffield, Lincoln and Preston were all rejected in the early stages.

The role of assessment

The role of assessment

Introduction

Why assess?

You may wish to assess your students' work for a variety of reasons. The style of assessment you use should reflect the purpose it has to fulfil. For example, you may be using the module in the context of an assessment scheme (e.g. the JMB Certificate of Numeracy through Problem Solving, GCSE coursework or Records of Achievement), or you may simply want to assess school work, to enable you and your students to recognise their progress.

The purpose will affect the aspects of your students' work that you decide to assess. These include (with examples)

- strategic skills (the ability to plan and organise)
- technical skills (the ability to read timetables accurately)
- social skills (the ability to take account of other peoples' viewpoints).

Each of these poses a distinct assessment challenge.

In this chapter, we will focus on ways of assessing and recording

- a student's work within a group setting
- the strategic and technical skills deployed, as referred to in the Introduction (pages T5 and T6).

We include illustrations of students' work based on the assessment tasks which are associated with each of the four module stages. In addition, we offer examples of two 'examination papers' for students of different ability levels. These papers may be used to help assess your students' retention of skills and their ability to transfer them to unfamiliar situations within the same context. In designing these assessment tasks we have sought to ensure their *curriculum validity*; i.e. that each task should also represent a valuable learning activity.

Assessing a student's work within a group setting

The theme of the module encourages group work, developing each student's ability to discuss, listen and cooperate with his or her colleagues. Such group work will often result in better planning than individual students could produce in isolation. Your observation of the groups at work will enable you to note some of the social skills which a student displays. Such skills include

- persistence and attention to detail
- the ability to coordinate the work of the group
- initiative
- the ability to work well in a team
- the ability to communicate.

These skills are valuable and worth recording whenever you are aware that they are being displayed by a student. It is difficult, however, to assess students reliably in this context because their performances are likely to be affected by the nature of the input from other group members, and by how well individuals can cooperate. A student may take an active role in one group, but be overshadowed by a dominant personality in another. Merely observing the work of the group as a whole may not give a clear picture of an individual's contribution, acquisition of skills, or understanding of the work of the group.

Thus, you may also wish to carry out some form of individual assessment. Four possible methods are:

- One-to-one discussion with an individual student, possibly using a checklist of some kind.

  This method is time-consuming, particularly with larger classes, and it is difficult to carry out an interview if you are simultaneously trying to supervise the rest of the class.

- Observation of individual students by the teacher.

  When groups are working cooperatively, group members tend to adopt complementary roles. This means that you are unlikely to see every student carrying out every task. This becomes more pronounced when class tasks are shared out amongst groups.

- Students completing a number of specific individual written assessment tasks at stages during the work which reflect their recent group activities.

  This has the disadvantages that some skills cannot be assessed in this way, and some students have difficulty in expressing themselves fully in writing, leading to responses which fail to reflect their true abilities.

- Students carrying out self-assessments, which describe those aspects of the group work where

they have made particular contributions. Such self-assessments may consist of written notes or the completion of a simple checklist.

A combination of these methods is likely to provide an optimum approach to assessment. Some written tasks may be used with follow-up interviews being carried out to clarify incomplete or confusing responses from individuals. Observation and self-assessment will provide further complementary information. With a class of very low attainers, where the numbers are often small, you may prefer to assess by using mainly oral methods.

Assessing with reference to criteria

The criteria listed below are restatements of the general strategic skills in the context of this module, and have been referred to throughout the classroom materials. Students are given the opportunity to show that they can, in the context of planning a trip,

   (i) evaluate a plan and identify faults in it (including expenditure of money and time),

   (ii) generate lists of alternatives,

   (iii) devise a satisfactory rough plan (including sensible costings and time schedules),

   (iv) use and describe a decision making process,

obtain and interpret information from

       (v) a telephone directory,

       (vi) aural and written timetables,

      (vii) a street map,

     (viii) a route map,

   (ix) identify omissions in given information,

   (x) place given jobs in a logical order,

   (xi) complete a clear and comprehensive final plan,

   (xii) take an active part in the planning process,

   (xiii) evaluate the plan which has been implemented.

Such criteria assist in providing a useful profile of relative strengths and weaknesses. However, to say that a student has satisfied a criterion, such as 'can evaluate a plan and identify faults in it', has little absolute meaning without specifying

- **the context.** Evaluating a plan for a trip is very different from evaluating a plan for the building of a house.

- **the complexity within the context.** Planning a trip round the world is far more complex than planning a trip into a local town.

- **the frequency of success.** Has the student satisfied the criterion on many occasions or only once? What proportion of attempts resulted in success?

- **the amount of help given.** How much help did the student receive from the teacher or other group members in understanding and completing the task?

- **the occasion.** When did the student attempt the task? How recently had the student experienced a similar situation?

- **the distance of transfer.** How closely did the task match the student's previous experience?

- **the mode of response.** How did the student respond to the task – in writing or orally?

Thus, if you are basing an assessment on work undertaken on this module alone, you will need to qualify any statement about a student's performance with some additional remarks like 'these abilities have been demonstrated while the student took part in planning a class trip to a local destination'.

If however students work through a range of extended activities, perhaps corresponding to the range of modules in this series, they are likely to develop the ability to demonstrate similar strategic skills in a variety of different contexts. This will then enable you to make more general statements about a student's ability to satisfy particular criteria.

Recording students' achievements

You may find it helpful to record your students' successes on a grid like the one shown on page 75. The criteria associated with this particular module have been listed across the top, and there are spaces for students' names to be filled in down the side.

There are many ways of filling in the cells in this grid. You may wish to record only that a student has satisfied or 'passed' a criterion, or you may wish to qualify this by recording, for example, the amount of help that was given and the frequency of success. Thus,

P   may mean 'pass with no help'

Ph   may mean 'pass with a little help'

PH   may mean a 'pass with a lot of help'

PP   may mean that a student has 'passed' the criterion on more than one occasion.

You may also wish to record whether a criterion was satisfied by a written or by oral response. Note that these may be assessed either by individual tasks or during the normal class work. If a student has not yet shown that he or she can satisfy a criterion, we suggest that the cell should be left blank, and the student be given a further opportunity at a later date so that only positive achievement is recorded.

An alternative would be to use a numerical grading system on a 3- or 5-point scale. But there is always a temptation to add such numbers so that a single score is obtained for each student. Although such a result is

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convenient, it is meaningless and misses the whole point of criterion-referenced assessment.

You may wish to extend your record sheet to allow space for comments concerning the social skills that your students have displayed, together with any particularly noteworthy achievements.

Assessing technical skills

It is relatively easy to test specific technical skills by assessment tasks which are context-free or set in a context contrived to give an air of realism. However, technical skills only become of value in problem solving when they can be deployed readily in the solution of the problem. This requires a student to choose an appropriate technical skill which he or she is confident in using. Thus the technical skill is a means to an end rather than an end in itself.

For these reasons, we feel that if technical skills are to be assessed, this should be done in real problem solving contexts. You will find examples of this throughout the sample assessment scheme. For instance, the Stage 1 assessment task requires students to perform calculations with money and time within a situation with which they are already familiar.

Record sheet

Name / **Criteria satisfied** A student has shown that he or she can:	**Stage 1**	**Stage 2**			**Stage 3**									**Stage 4**
	(i) evaluate a plan and identify faults in it (including expenditure of money and time)	(ii) generate lists of alternatives	(iii) devise a satisfactory rough plan (including sensible costings and time schedules)	(iv) use and describe a decision making process	obtain and interpret information from	(v) a telephone directory	(vi) aural and written timetables	(vii) a street map	(viii) a route map	(ix) identify omissions in given information	(x) place given jobs in a logical order	(xi) complete a clear and comprehensive final plan	(xii) take an active part in the planning process	(xiii) evaluate the plan which has been implemented.

M35

Using the assessment tasks

We will now look at a selection of the assessment tasks in more detail. With each task we include

- the related assessment criteria
- examples of students' work to illustrate the type of response which might satisfy particular criteria
- suggestions on recording achievement, using the approach already described.

These 'satisfactory' responses indicate what we believe is achievable by a substantial majority of 13–16 year old students. You may wish to vary this standard, however, depending on the ability level of your students and the particular assessment approach you are adopting.

The tasks included here are:

Stage 2, Assessment task 2   'Ideas leaflet'
Stage 2, Assessment task 3   'The vote'
Stage 3, Assessment task 5   'Asking for permission'
Stage 3, Assessment task 6   'Sorting out jobs'

Stage 2 Assessment task 2

'Ideas leaflet'

Related criterion:

(iii) A student can devise a satisfactory rough plan including sensible costings and time schedules.

Required response

The 'Ideas leaflets' should give sufficient information for the class to make a decision. It should include

- the exact destination
- a description of possible activities
- some awareness of possible modes of transport and their feasibility in terms of time
- itemised, realistic costs
- a complete timetable showing realistic estimates and consistent with the rest of the information on the leaflet.

As the task is designed to show how well individuals have understood the work of the group, you should also take into account your observations of students' individual contributions.

Trevor and Susan, for example, are members of the same group. Susan's 'Ideas leaflet' shows that she has thought through the trip carefully and has made reasonable estimates about money and time, so she satisfies the criterion. Trevor, on the other hand, has failed to convey an adequately detailed description of what can be done in London, a sufficient number of travel details, or a realistic, itemised costing. The timetable is adequate, though brief. It may be that Trevor took a satisfactory part in the work of the group but has problems expressing himself in writing, in which case he needs to talk through the trip and write down the ideas as he says them.

Susan

Ideas leaflet

Filled in by ___Susan___

Come on our trip to . . .

LONDON
CITY
OF
EXITEMENT

What you can do there . . .

Visit the Planetarium
Visit Madam Tusords
Visit other museums
Go to the Zoo
Go shopping

Possible travel details . . .

Train - takes about 2 hours
So that would leave
enough time
Coach takes longer so
wouldn't be so good

Rough costs . . .

Train fair £10 if we get
a discount
Lunch £3 or packed lunch
Planetarium about £2
Madam Tusords about £2
but we might get a
discount

Rough timetable

Time	Where you will be and what you will be doing
8·00	meet at school / Go to station
9·00	get a train
10·00	
11·00	get to London / walk to planetarium
12·00	
1·00	Have lunch
2·00	go to Madam Tusords
3·00	go back to station
4·00	catch the train back
5·00	
6·00	get back
7·00	go home

M6

Trevor

Ideas leaflet

Filled in by ___Trevor___

Come on our trip to . . .

London

What you can do there . . .

Shoping
Museums

Possible travel details . . .

Train Coach

Rough costs . . .

£5

Rough timetable

Time	Where you will be and what you will be doing
8-30	Leave
10-30	Arrive
11-30	Shops
12-30	Museums
4-30	Train Back
6-30	get back

M6

77

The vote

Six people are planning a trip. Six different places have been suggested.

a) The ice rink
b) Zoo
c) Bowling alley
d) A castle
e) Snooker hall
f) Swimming pool

In order to choose between these places, they decide to vote.

Each person is given a list, and they write down their preferences.

This is what they write:

Sanjay		John		Claire	
a) Ice Rink	**6th choice**	a) Ice Rink	1st Choice	a) Ice Rink	6th choice
b) Zoo	**1st choice**	b) Zoo	2nd Choice	b) Zoo	5th choice
c) Bowling	**3rd choice**	c) Bowling	5th Choice	c) Bowling	1st choice
d) Castle	**2nd choice**	d) Castle	4th Choice	d) Castle	2nd choice
e) Snooker	**4th choice**	e) Snooker	3rd Choice	e) Snooker	4th choice
f) Swimming	**5th choice**	f) Swimming	6th Choice	f) Swimming	3rd choice

Mike		Elaine		Jenny	
a) Ice Rink	4th choice	a) Ice Rink	6th choice	a) Ice Rink	6th choice
b) Zoo	6th choice	b) Zoo	3rd choice	b) Zoo	5th choice
c) Bowling	5th choice	c) Bowling	2nd choice	c) Bowling	4th choice
d) Castle	3rd choice	d) Castle	1st choice	d) Castle	2nd choice
e) Snooker	1st choice	e) Snooker	4th choice	e) Snooker	3rd choice
f) Swimming	2nd choice	f) Swimming	5th choice	f) Swimming	1st choice

Which place would be the best choice for their trip? _____

Explain how you get your answer:

_____

_____

_____

_____

_____

_____

_____

_____

_____

M7

Stage 2 Assessment task 3

Related criterion:

(iv) A student can use and describe a decision making process.

Required response

The best choice for the trip is the castle. This answer can be arrived at through a variety of different decision-making methods. For example

- adding the rankings gives (a) 29, (b) 22, (c) 20, (d) 14, (e) 19, (f) 22
- rejecting any option which is someone's 5th or 6th preference leads to (d) or (e), and of those (d) is clearly the better choice
- counting the number of 1st and 2nd preferences for each destination leads directly to (d).

If a different answer is reached, through a clearly described sensible process, the student also satisfies the criterion.

Wayne

Which place would be the best choice for their trip? *Castle*

Explain how you get your answer:

Add up number of choice the leaste number is Highest up most lists

a) The ice rink 29	d) A castle 14
b) Zoo 22	e) Snooker hall 19
c) Bowling alley 20	f) Swimming pool 22

Wayne has used the first method correctly, although the explanation is poor. He has satisfied the criterion.

Claire

Which place would be the best choice for their trip? *castle*

Explain how you get your answer:

because it is the best on the list the most populer is Castle because it was most favourite

Claire has not explained her method. She should be asked to explain how she reached her answer in order to satisfy the criterion.

Shazida

Which place would be the best choice for their trip? *castle*

Explain how you get your answer:

give everyone 3 votes

ice rink III	castle IIIII
zoo III	snooker III
bowling III	swimming III

Shazida has used a different method, giving each person's first three choices equal weighing. The method is clear so her response satisfies the criterion.

Asking for permission

Imagine that *your* class is going on a trip to *your* local swimming baths next Tuesday morning.
One person has volunteered to write a letter to parents, asking for permission:

Dear Parent,
  We are going to the swimming baths
next Tuesday.

If _____ can go, please tick the box.

- -
Reply slip (Tear off and return to school)

  I agree that he/she can go.

Make a list of all the important details that have been missed out of the letter.

Stage 3 Assessment task 5

Related criterion:

(ix) a student can identify omissions in given information.

Required response

Important details that have been missed out include

- money required
- date of visit
- time of departure
- time of return
- member of staff responsible
- what people should bring
- space for signature on reply slip
- student's name on reply slip

It is reasonable to expect that at least five points are mentioned, one of these being the date.

In the examples of work shown below, Philip is the only student who has not satisfied the criterion. Trudi has included the necessary details in her letter, showing an ability beyond that required by the task.

Andrew

The DATE
Who is TAKEING THEM
THE TIMES OF DEPARTURE AND ARRIVLE
IF IT COSTS ANY Money
Sighned by the teacher

Nina

Name of Child.
Parent= Signed.
Date
Which Baths they are going to
DO they need any Bus fair
How they are getting their
what time they will leave School
what time they will return Home.
teacher in charge.
How long will they be their
if they need any pack Lunch.

Philip

What time do we Set Off,
How much will it cost,
what time do we get back
What do we need as Sandwiches

Trudi

Dear parent,
We are going on a trip to Altringham Swimming baths on Tuesday 20th July. The head master has given us permission. If _ _ _ _ _ _ _ _ _ can go please tick the box. Your child will need at least one pound fifty for entrance fees and bus fares plus his/her own food. We will leave at 12·00 we will arive home at 4·15.
Signed _ _ _ _ _ _ _ _

Sorting out jobs

You will need a set of 8 leisure centre job cards.

A class have chosen to go to a Leisure Centre for the morning.
Some want to go swimming, while others want to play table tennis, squash, badminton or snooker.
There are 3 leisure centres within a bus ride from their school.

They have written all the jobs that need to be done on cards.

Job E
Add up all the costs of travel an'
leisure centre activities.

Ask permission f
'··re This n

Job A
Make a *firm* booking at the leisure centre.
This means that you *know for certain* that
you can go, and you want them to reserve
a space.

Job H
Provisionally book the leisure cen'··
·'·at you're n··
·c·

Job G
·e journey details
·us to catch
·ime it leaves and returns
·much it costs.

Job C
Work out how much money each p
will need to take.

*Tell the class what spor··s are available
and decide which leisure centre to go to.*

Jc

·ε centres and find out
·ble
·ity costs

- Try to sort your job cards into order of priority.
  (Which job needs to be done first? second? third? and so on.)

- When you have done this, write down the jobs in order in the boxes below.
  (The first one has been done for you.)

1st	2nd	3rd	4th	5th	6th	7th	8th
B							

This means that job B must be done first.

M32
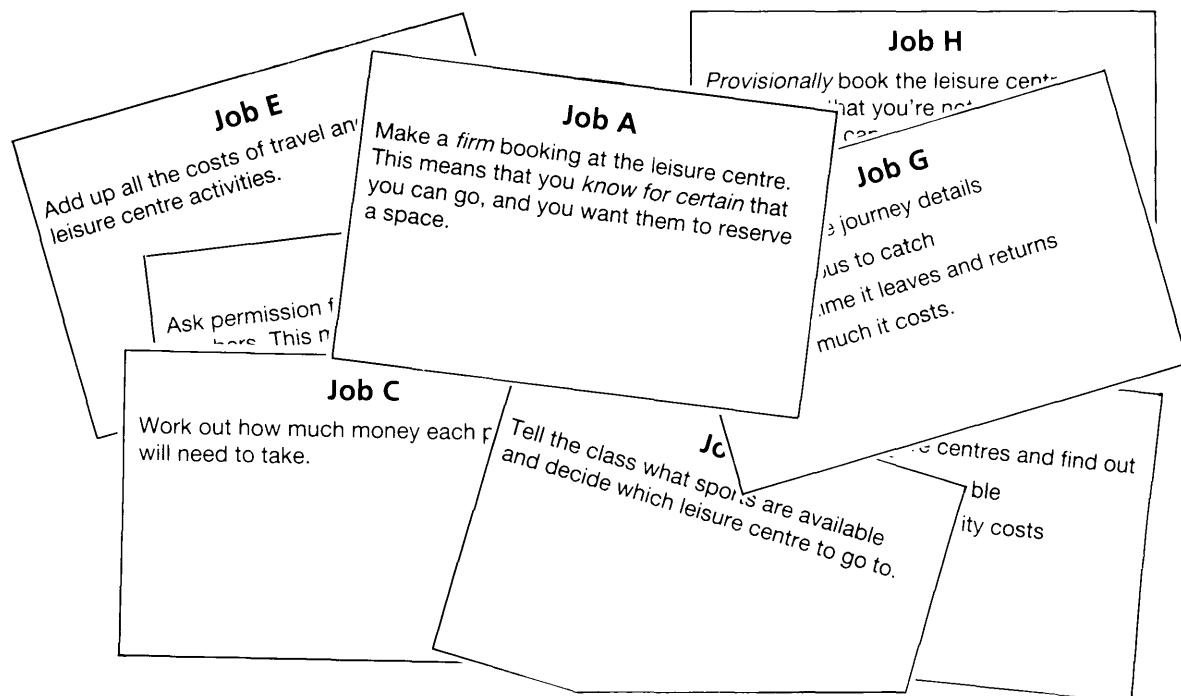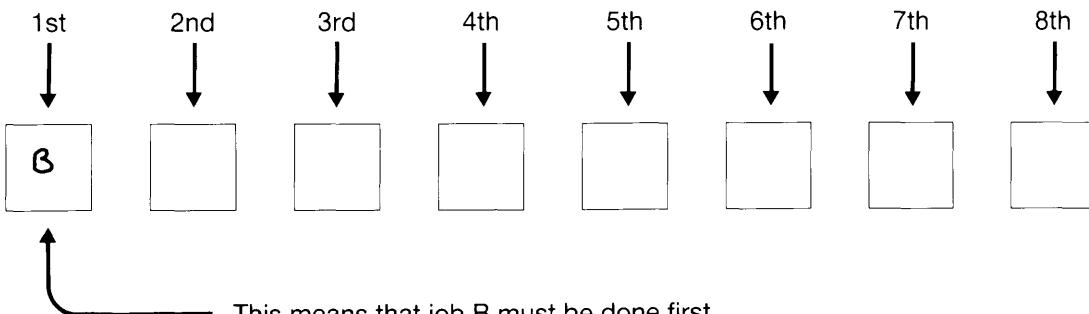
Stage 3 Assessment task 6

Related criterion:

(x) A student can place given jobs in a logical order.

Required response

Several orders for the jobs are possible, but there are some sequences which must be preserved.

- Job F must come before job E.
- Job F before job H before job D before Job A.
- Job G before job E before job C before job D.
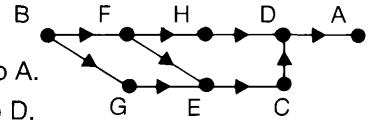
Other sequences are debatable, for instance whether job F should come before job G or not.

Azram

1st	2nd	3rd	4th	5th	6th	7th	8th
B	F	H	G	E	C	D	A
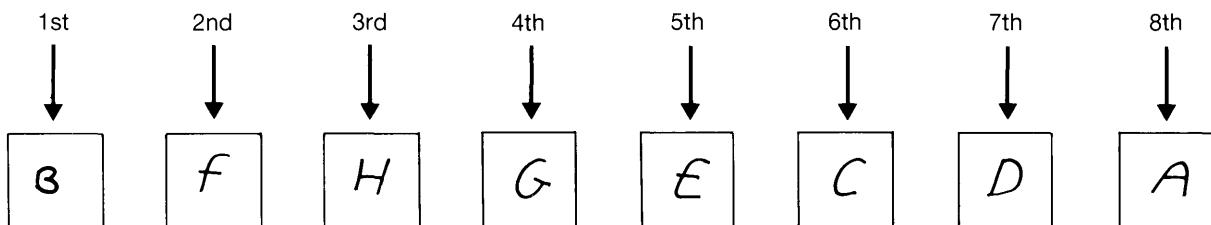
Azram's order is well thought out so he satisfies the criterion.

Azim

1st	2nd	3rd	4th	5th	6th	7th	8th
B	F	E	G	C	H	D	A
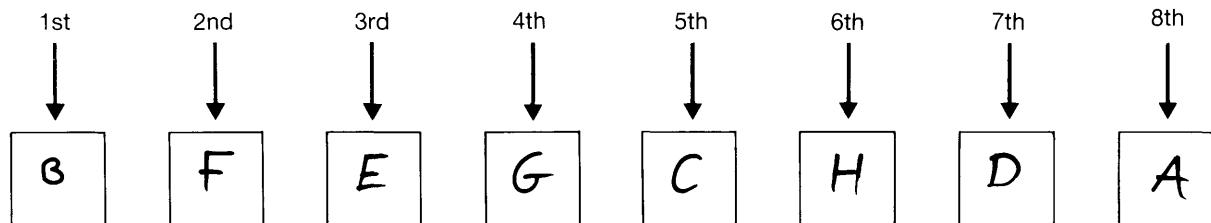
Azim has got the 'G E C' sequence wrong, so he should be given the opportunity to think through the task again.

Lisa

1st	2nd	3rd	4th	5th	6th	7th	8th
B	C	G	F	E	D	H	A
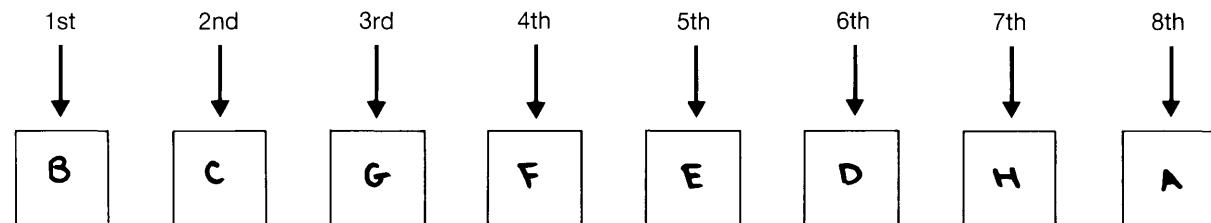
Lisa's sequence is unworkable and it is likely that she would benefit from further work in order to be able to satisfy the criterion.

Written examination papers

The two examination papers which follow may serve as a useful resource in assessing a student's ability to retain and transfer the skills to fresh situations in the same context.

Paper 1 is intended for nearly all students.
Paper 2 is intended for approximately the top 30% of students.

A day out in Derbyshire

You will need the information sheets M37, M38, M39 and M40.

Alison and two of her friends live in Loughborough. They have planned a cycling trip around Derbyshire for Saturday 25 October. Alison's mum has offered to go with them if necessary, since all three girls are only 15 years of age.

Unfortunately, the girls have made many mistakes and forgotten several things in their planning!

1. Read through their plan and the information sheets carefully. Whenever you find a mistake, or realise that something has been forgotten, write it down *and* say how they should change their plan.

The girls' plan

Meet at Loughborough station at 7.23 a.m. Buy tickets and then catch the train to Derby. This arrives at 7.51 a.m.

At Derby, catch the 8.20 a.m. train to Cromford.
This arrives at 8.41 a.m.

Here are the instructions for getting to the Cycle Hire Centre:

"Turn left as you come out of Cromford station, walk along by the river, cross over Cromford bridge and walk down Mill road. Cross over the A6, and walk through Cromford. Keep going for about half a mile up Cromford hill and you should see Oakerthorpe road on your left. Walk up this a little way and you'll see the car park and picnic site where they hire out the bikes."

Arrive at the cycle hire centre just before it opens at 9.30 a.m. Each person only needs £2 to hire a bike for the whole day.

Cycle along the High Peak Trail, until it meets the A515. Then go through Monyash and along the B5055 into Bakewell — a total distance of about 15 miles. We'll allow 3 hours for the ride, so we should arrive in Bakewell by about 12.30 p.m.

Spend about an hour in Bakewell, have a look round the shops, buy and eat our lunch.

At 1.30 p.m. leave Bakewell and cycle over to Chatsworth House, where we'll spend 2 hours looking around the House, Garden and Adventure playground.

At 4.00 p.m. leave Chatsworth and cycle down the B6012 and the A6, arriving at Matlock at about 4.30 p.m., where we'll look around the shops until 6.00 p.m.

Ride the couple of miles back to Cromford, and catch the train that leaves at 19 minutes past 6.

The train arrives at Derby at a quarter to 7. Wait around for the 7.58 p.m. train to Loughborough. This arrives at 8.14 p.m.

2. Alison and her friends eventually sort out their mistakes. Alison starts to make a list showing everything she must bring.
   Copy and complete her list. (Make sensible guesses at figures you don't know.)

Each person must bring:

Money for	(amount)	Other things
	£	
	£	
Total	£	

M36

≷ Train Service information

Mondays to Fridays (continued)

		125 ∅ ◆	125 ▲	125	125 ∅	B 125 ▼	125	125	A 125	125	125
London St Pancras	d	17 25	17 35	18 15	18 23	19 05	19 45	20 40	21 05	21 40	23 20
Loughborough	a	—	19 30	—	19 50	—	21 22	22 13	22 34	23 19	01 11
Nottingham	a	19 07	—	20 00	—	20 56	21 41	22 30	—	23 39	01 30
Derby	a	—	19 59	—	20 16	—	22 11	23 07	22 59	00 06	01 57

Saturdays

		125		125	125	125	125	125	125
London St Pancras	d	00 05	04 50	07 00	07 45	08 05	09 10	09 25	10 15
Loughborough	a	02 36	07 23	08 42	—	09 39	—	11 02	11 44
Nottingham	a	02 55	—	09 01	—	09 59	—	11 22	12 03
Derby	a	03 33	07 51	—	09 33	—	11 02	—	—

Saturdays (continued)

		125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125
Derby	d	—	11 25	—	11 59	13 25	—	14 25	—	15 40	15 01	16 40	—	17 58	—	19 10	20 21	—	21 32
Nottingham	d	10 30	—	11 50	12 50	—	13 50	—	14 50	—	15 50	—	17 05	—	18 35	—	—	20 27	—
Loughborough	d	10 44	11 44	—	13 04	—	—	14 44	15 04	—	16 04	—	—	18 14	18 49	19 26	—	20 44	21 49
London St Pancras	a	12 30	13 29	13 34	14 45	15 15	15 49	16 30	16 36	17 30	17 46	18 33	18 57	19 51	20 37	21 08	22 12	22 30	23 48

Saturdays

											A				
Sinfin Central	d	....	....	....	....	....	....	....	....	....	....	....	....
Sinfin North §	d	..	..	..	..	..	..	..	..	..	..	..	..
Peartree	d	....	....	....	....	....	....	....	....	....	....	....	....
Derby	a	..	..	..	..	..	..	..	..	..	..	..	..
London St. Pancras ⊖ 53	d	....	....	0745	0910	....	1135b	1235b	1515b	1630b	....	2105	....
Nottingham 80	d	..	0731	0844	1033	1153	1354	1453	1650	1800	..	2138	..
Derby	d	0630	0820	0947	1115	1235	1422	1523	1724	1832	2032	2312	....
Duffield	d	0637	0827	0954	1122	1242	1429	1530	1731	1839	2039	2319	..
Belper	d	0641	0831	0958	1126	1246	1433	1534	1735	1843	2043	2323	....
Ambergate	d	0647	0837	1004	1132	1252	1439	1540	1741	1849	2049	2329	....
Whatstandwell	d	0651	0841	1008	1136	1256	1443	1544	1745	1853	2053	2333	..
Cromford	d	0656	0846	1013	1141	1301	1448	1549	1750	1858	2058	2338	..
Matlock Bath	d	0658	0848	1015	1143	1303	1450	1551	1752	1900	2100	2340	....
Matlock	a	0701	0851	1018	1146	1309	1453	1554	1755	1903	2103	2343	....

Saturdays

Matlock	d	....	0708	0855	1025	1200	1315	1458	1600	1815	1908	2115	2348	....
Matlock Bath	d	..	0710	0857	1027	1202	1317	1500	1602	1817	1910	2117	2350	..
Cromford	d	....	0712	0859	1029	1204	1319	1502	1604	1819	1912	2119	2352	....
Whatstandwell	d	..	0717	0904	1034	1209	1324	1507	1609	1824	1917	2124	2357	....
Ambergate	d	0002	0722	0909	1039	1214	1329	1512	1614	1829	1922	2129	0002	....
Belper	d	0007	0727	0914	1044	1219	1334	1517	1619	1834	1927	2134	0007	..
Duffield	d	0011	0731	0918	1048	1223	1338	1521	1623	1838	1931	2138	0011	....
Derby	a	0018	0738	0925	1056	1230	1345	1531	1630	1845	1938	2145	0018	..
Nottingham 80	a	....	0817	1005	1157	1300	1414	1559	1703	1925	2033	2227	....	....
London St. Pancras ⊖ 53	a	0509	0945	1141b	1329	1515b	1630b	..	1833b	2108	2212	..	0537	..
Derby	d	....	....	....	....	....	....	....	....	....	....	....	....	....
Peartree	d	..	..	..	..	..	..	..	..	..	..	..	..	..
Sinfin North §	d	....	....	....	..	....	....	....	....	....	....	....	....	....
Sinfin Central	a	..	..	..	..	..	..	..	..	..	..	..	..	..

Children

Children aged 5 and under 16 travel at half fare Children aged under 5 years travel free, provided not more than 4 accompany each fare-paying passenger and they do not occupy seats required for other fare paying passengers

Cost of a return adult fare from Loughborough to Cromford – £3.90.

M37

REFERENCE

Public Toilets —————— (T)
Car Park —————————— (P)

APPROX SCALE:

0 ————————————— ½
            mile

Based upon a map produced by Derbyshire Dales
District Council.

Based upon the Ordnance Survey Map with the
Sanction of the Controller of H.M. Stationery Office
Crown Copyright Reserved.

M38

M39
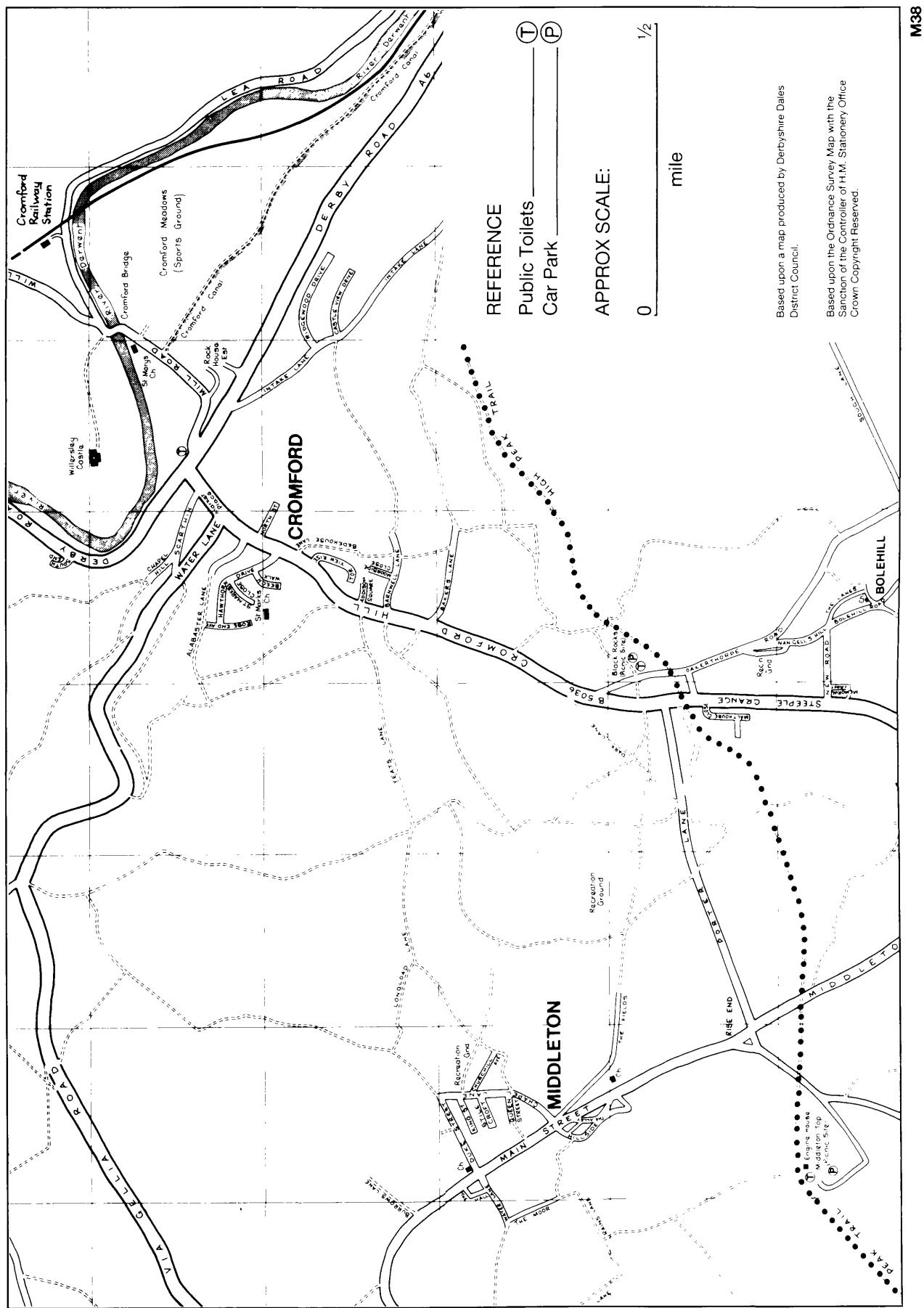
Cycle hire information

CYCLE HIRE CENTRE	LOCATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	JAN 87	FEB 87	MAR 87
MIDDLETON TOP End of season Cycle Sales November 5th **Tel: (062 982) 3204**	Middleton Top Picnic Site & Information Centre, on the High Peak Trail next to the Old Engine House. Signposted off the B5036 Cromford to Wirksworth road **OS MAP 119 Grid Reference SK276552**	Open for Bookings only	Subject to weather conditions	Open 28 to 31 & Bookings	Open 1 to 6, 12 & 13, 19 & 20, 26 & 27 & Bookings	Open 3 to 5, 10 & 11, 17 & 18, 24 to 31 & Bookings	Open every day	Open every day	Open every day	Open 1 to 7, 13 & 14, 20 & 21, 27 & 28 & Bookings	Open weekends & Bookings	Open 1 & 2 & Bookings	Open for Bookings only	Open for Bookings only	Open for Bookings only	Open 28 & 29 & Bookings
HAYFIELD	Hayfield Station Picnic Site on the Sett Valley Trail, just off the A624 Chapel en le Frith Glossop road	Open for Bookings	Open for Bookings only	Open 28 to 31 & Bookings	Open 1 to 6, 12 & 13 & Bookings	Open 3 to 5, 10 & 11 & Bookings	Open 1, 7 & 8, 14 & 15,	Open every day	Open every day	Open weekends	Open for Book	Open for	Open for	Open for	Open for	Open 28

CYCLE HIRE CENTRES

Average cycling speed is about 8 mph.
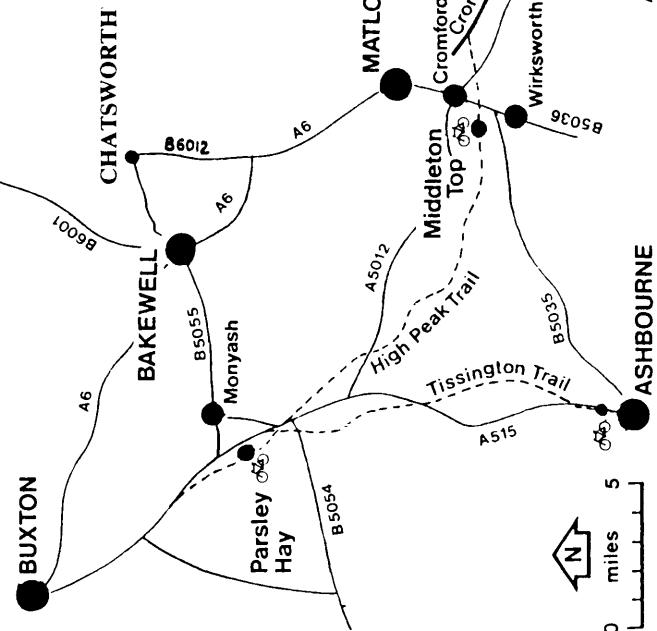
Based upon a map produced by the Derbyshire Dales District Council (Crown Copyright reserved) and on information from Peak District National Park.

WHERE TO?

You may follow your nose along the country roads and bridleways, or try one of the circular routes that have been waymarked from some of the hire centres. OR you may prefer the complete lack of motor traffic that can be enjoyed if you cycle exclusively on the trails.

TISSINGTON and HIGH PEAK TRAILS – The trails have been converted from former railways to form fine scenic routes through varied countryside, where visitors can enjoy a picnic, long and short walks, pony trekking, as well as cycling. Explore the trails in your own way but please remember:

* Cycles must give way to pedestrians on the trails
* Cycles are not permitted on footpaths; you can go anywhere on roads and bridleways,
* Beware of traffic especially on main roads.
* Please follow the Country Code.

You may meet Countryside staff working on the trails who will be pleased to help you with any further information.

WHEN?

CYCLE HIRE CENTRES will normally be open 9.30 to 18.00 hours, out may close later at busy periods subject to demand.

PARTIES (10 people or over) may reserve cycles at off peak times (normal operating hours, excluding Sundays and Bank Holiday periods). Party bookings outside normal operating hours are possible by prior arrangement.
For full details see the PARTY BOOKING LEAFLET.

CHILDREN under 16 must be accompanied by an adult.

FOR THE DISABLED
Tandems and Tricycles are available from National Park centres, primarily for hire by groups including a handicapped person (e.g. blind or partially sighted person). For larger groups it may be possible to have several tandems delivered to one of the centres.

HOW MUCH?

At **Ashbourne, Derwent, Parsley Hay, Waterhouses, Middleton Top, Hayfield** and **Bollington.**

	ADULT	CHILD (15 & under)
3 HOURS	£1.70	£1.20
DAY	£3.20	£2.20
LAST 2 HOURS	£1.00	£1.00
PERIOD HIRE (per person, per day – 2-day minimum)	£2.90	£2.00

There is a £2.00 returnable deposit on each cycle.

PROOF OF IDENTITY MUST BE GIVEN, e.g. driving licence or similar. **Payment by cheque is welcomed.** (Banker card essential.) **VISA and ACCESS cards are welcome** at National Park Centres.

CHATSWORTH

Derbyshire

CHATSWORTH

Home of The Duke & Duchess of Devonshire

One of England's most beautiful and best-loved houses, in a splendid setting on the banks of the River Derwent in the Peak District National Park.

Chatsworth is famous the world over for its unrivalled private art collection, state apartments, and the Garden with cascade and fountains. The present House was built in 1678-1707 for the 1st Duke of Devonshire, with additions by Wyatville for the 6th Duke between 1820 and 1830.

A DAY AT CHATSWORTH

A visit to Chatsworth is much more than a visit to one of the most beautiful houses in Great Britain. There are plenty of things to see and do to interest all members of the family for a whole day.

Chatsworth House contains one of the finest collections in the world of paintings, furniture, tapestries, china, sculpture and gold and silver plate, collected by fifteen generations of Cavendishes. Visitors follow, at their own pace a clearly marked route round the House for which you should allow at least one hour.

The 105 acre garden is famous for its landscape, fountains and cascade. It is so big that there is always room to find peace and quiet. Dogs on leads are welcome.

Children find the Farmyard particularly interesting, especially the daily milking demonstration. The Adventure Playground, within the Farmyard, thrills and delights children of all ages.

ADMISSION CHARGES

House and Garden

Adults	£3.20
Senior Citizens	£2.50
Children (under 16)	£1.50
Students	£2.50
Family Ticket	£8.00

Pre-booked Parties

Adults	£2.75
Senior Citizens	£2.25
Students	£2.25
School Parties (including accompanying staff)	£1.50

Garden only

Adults	£1.50
Children	£0.75

Farmyard and Adventure Playground

Adults	£1.30
Children	£0.70
Family	£3.50

Scots Suite

Adults	£0.30
Children	£0.15

Car Park £0.50

OPENING TIMES

23rd March to 26th October, 1986	Opening times House Garden EVERY DAY 11.30-4.30 11.30-5.00 Visitors are asked to conclude their visit to the House and Garden one hour after the above times.
Farmyard and Adventure Playground 23rd March to 21st September	EVERY DAY 10.30-4.30
Saturday & Sunday 30th & 31st August	House and Garden open to Country Fair visitors only.
Friday, Saturday & Sunday, 3rd, 4th & 5th October	House and Garden open to Horse Trial visitors only.

CHATSWORTH

Trips on the Leeds – Settle – Carlisle railway

You will need to refer to the information sheets M44, M45 and M46 for this task.

Imagine that you were the organiser for two separate day trips due to leave from Keighley on Saturday 19th September 1987. The two groups set off on the same train, but return separately. The groups are:

a) **The Americans.** A group of 12 adults from the USA which is at present touring Britain. The Americans plan to spend the nights of 18th and 19th September at the White Lion, Haworth, near Keighley. Some of the group wish to spend the Saturday in Haworth; others want to go for a day trip to Carlisle. You are to be the guide on the Carlisle trip. (See task A.)

b) **The 'Over 70's'.** You have promised to organise a day out for a group of them which will include both train and bus travel. They can't walk far and the cost must be kept down. (See task B.)

a) The Americans

It is the evening of Friday 18th September, the day before the trips. You go to the White Lion in Haworth to answer questions from the Americans about their trip to Carlisle.

1. Using the information sheets, write down answers to their questions on a copy of the table shown below. (Their first three answers have already been given.)

How will we go to Carlisle?	By train from Keighley station.
How do we get from Haworth to Keighley?	By bus; it only takes 15 minutes or so.
When does the train leave Keighley station?	At 9.05 a.m.
When does it get to Carlisle?	
We want to be back at the White Lion by 7.30 p.m. When do we have to leave Carlisle?	
How long will we have there?	
How much is the train fare?	
Roughly how long does each train journey take?	
What is there to see in Carlisle?	
Tell us some interesting sights to watch out for from the train.	

Trips on the Leeds – Settle – Carlisle railway (*continued*)

a) The Americans (*continued*)

2. You plan to take the Americans on a sight-seeing walk around Carlisle. A map of Carlisle and a plan for the walk are shown on page 3 (M43). Read through the plan carefully, and, on a copy of the map, show
   a) the *route* of the walk
   b) the likely positions of the underlined landmarks, using the letters given in brackets.
      (For example, the <u>Citadel</u> is at 'A'.)

3. Estimate the total length of the walk in metres.

4. Some of the party want to spend 20 minutes in the Lanes Shopping Centre. What is the latest time that the group should be walking past the Civic Centre, if they are to be sure of catching the train without hurrying?

5. As you pass the Civic Centre, a lorry driver stops to ask you how to get to the Victoria viaduct. Write down clear directions for a route for the driver.

b) The 'Over 70's'

You visit the 'Over 70's' club to plan their day out for them. First you find out what they want . . .

> 'We don't want to spend more than £7.00 each on travel.'
> 'We'd like to go on the train and on a bus – see some nice scenery – have a cup of tea somewhere interesting – buy some souvenirs for folks at home.'
> 'We don't want to be back too late.'

1. You recommend that they travel by train to Garsdale and then by bus to Sedburgh or Hawes. You have already found out that the bus fare from Garsdale to Sedburgh costs £1.00 return, and the fare from Garsdale to Hawes costs £1.10 return.
   Give as many details as you can of each of the two alternative trips, so that the club members can decide which they prefer.

2. They ask you which of the choices in question 1 you think is the best. Say which you would recommend. Explain why you would recommend it.

3. Assume that they agree with your choice, but would like some further information. Answer their questions.

   ■ 'How much will the travel cost each of us?'

   ■ 'How long will we have there before we catch the bus back?'

   ■ 'I have a friend in York who wants to come.
      How much would the travel cost her?
      What is the earliest time she could get back to York?'

Carlisle

Plan for the walk.
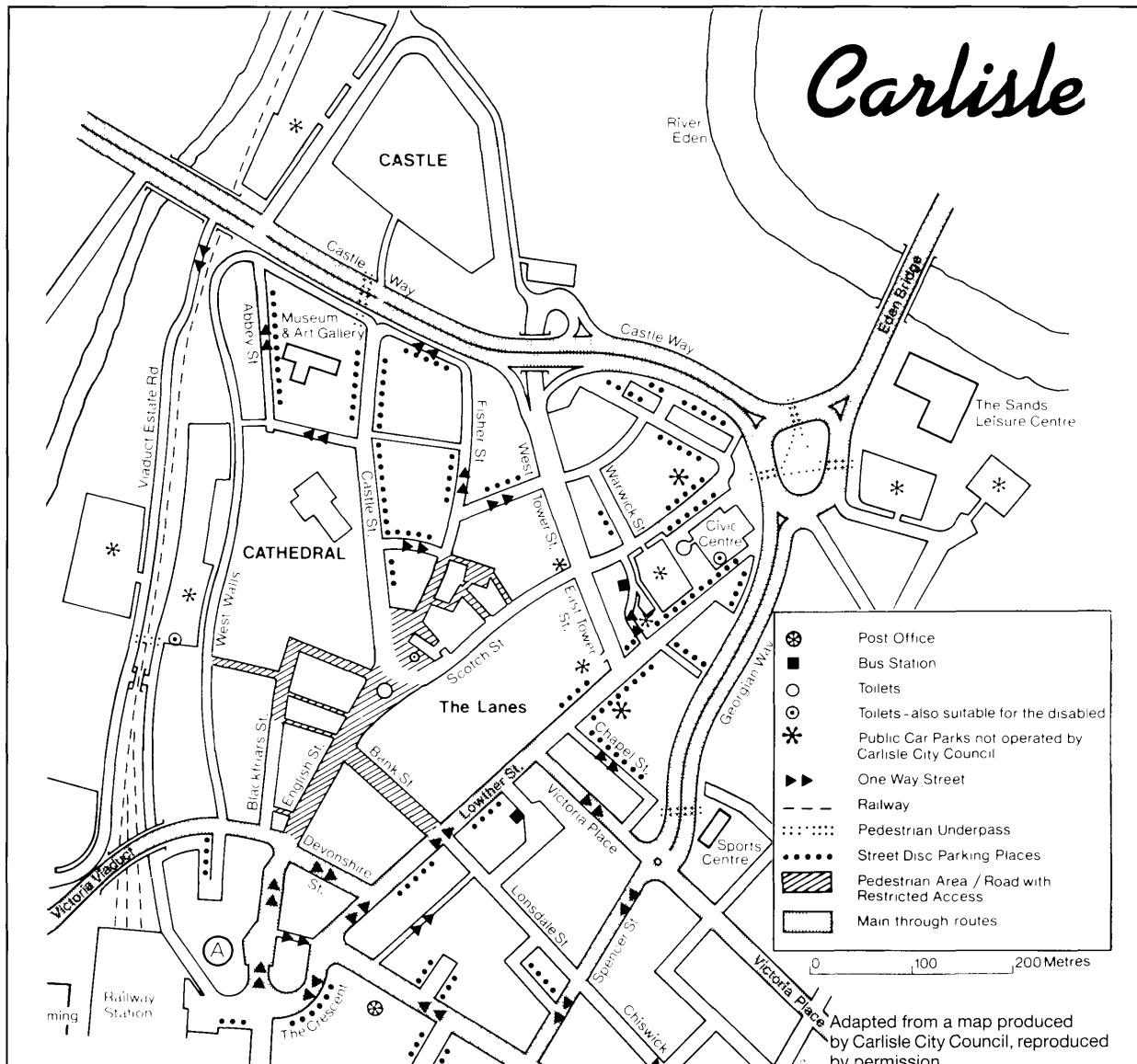
Adapted from a map produced by Carlisle City Council, reproduced by permission.
Crown Copyright reserved.

After arriving by train, walk past the <u>Citadel</u> (A), then turn left at the crossing, along Victoria Viaduct. Look for the little street, second right, called <u>West Walls</u> (B). Walk along West Walls a little, then turn first right along St Cuthbert's Lane, with <u>St Cuthbert's church</u> (C) on the left, just after Blackfriars Street, and so into the Market Square, with the <u>Market cross</u> (D) facing you. Turn to the left and you'll see the old <u>Town Hall</u> (E). Walk along Castle Street a little, then left into the Cathedral grounds, opposite the one-way street. After looking at the cathedral, continue past the black gates into <u>Abbey Street</u> (F) with the museum at the right.

Leave the museum by the rear exit, then under the <u>archway</u> (G) into Castle Street and through the subway to the Castle grounds. You can picnic or walk along the River Eden in nearby <u>Bitts Park</u> (H). Return to the station through the roundabout underpass, passing the Civic Centre on your left. Turn right opposite the car park, then left, and over the crossroads into <u>Market Street</u> (I). Turn left and you are soon back in the Market Square.

You can browse around The Lanes shopping centre before returning to the Railway Station.

Page 3

M43

PAPER 2 INFORMATION SHEET

M44

Discover the **LEEDS SETTLE CARLISLE**

England's Greatest Scenic Railway

TRAVEL GUIDE AND TIMETABLE

11 May 1987 to 15 May 1988

MORE trains

LEEDS–SETTLE–CARLISLE RAILWAY

This line was opened by the Midland railway in 1876 as its new main line to Scotland in competition with the two established routes. Forced by geography to head north through the Pennines, the result is England's most scenic route with many dramatic viaducts and tunnels as the line passes through the superb scenery of the Yorkshire Dales and the Eden valley.

FOR MORE INFORMATION ABOUT LOCAL ATTRACTIONS AND ACCOMMODATION WRITE TO:

Yorkshire Dales National Park, Colvend, Grassington, Skipton, North Yorkshire BD23 5LB
or ask at a local Tourist Information Centre (list overleaf)

GUIDED WALKS will be organised in connection with some normal service trains — on Sundays off the 1024 from Carlisle, on most Saturdays off the 0842 from Leeds. Details from Yorkshire Dales National Park (address above)

DALESRAIL

A PROGRAMME OF RAIL EXCURSIONS AND GUIDED WALKS OPERATES FROM LEEDS AND PRESTON ON SELECTED WEEKENDS

From Leeds   on 17 May, 7 & 21 June, 5 & 19 July, 2 & 16 August, 6 & 20 September, 4 October, details from YDNP (G) (address above)

From Preston   on 9 May, 6 June, 4 & 5 July, 1 & 2 August, 5, 18 & 19 September, 30 October, details from Dalesrail, PO Box 9, Guild House, Cross St, Preston PR1 8RD

7 DAYS on the SETTLE-CARLISLE
Ask for leaflet giving details of suggested outings

The Friends of the Settle-Carlisle Line Association

Reproduced by permission of British Rail Provincial

FARE DEALS

CARLISLE

Single and Cheap Day Return Fares from 11 May 1987
(subject to alteration from January 1988)

CARLISLE																			
1 90	Armathwaite																		
2 80	1 40	Lazonby																	
3 20	2 10	1 40	Langwathby																
4 00	3 00	2 50	2 10	APPLEBY															
4 30	3 40	3 00	2 60	1 50	Kirkby Stephen														
5 00	4 20	3 90	3 40	3 00	1 50	Garsdale													
5 30	4 40	4 00	3 60	3 10	2 20	1 10	Dent												
6 10	5 40	5 00	4 20	3 20	2 20	1 30	Ribblehead												
6 40	5 60	5 30	4 40	3 50	2 40	1 50	1 10	Horton											
7 20	6 30	6 00	5 60	4 10	3 10	2 20	1 80	1 50	SETTLE										
7 40	6 60	6 30	5 90	4 70	3 80	3 10	2 70	2 40	1 10	Long Preston									
7 60	6 90	6 50	6 20	5 30	4 00	3 30	2 90	2 60	1 30	Hellifield									
7 70	7 10	6 70	6 50	5 30	4 30	3 60	3 30	2 90	1 90	Gargrave									
7 80	7 30	6 90	6 70	6 00	5 50	4 70	4 20	3 80	3 50	2 30	SKIPTON								
8 40	8 00	7 70	7 00	6 10	5 10	4 80	4 70	4 20	3 80	2 70	Keighley								
												Crossflats							
9 00	8 50	8 10	7 80	7 20	6 30	5 40	5 10	4 40	4 10	3 00	Bingley								
												Saltaire							
9 30	8 80	8 50	8 20	7 70	7 00	6 10	5 80	5 00	4 60	3 90	Shipley								
9 30	8 80	8 50	8 20	7 70	7 00	6 10	5 80	5 00	4 60	3 90	BRADFORD F.S.								
10 00	9 40	9 10	8 90	8 20	7 50	6 60	6 30	5 50	5 20	4 50	LEEDS								

Special Day Return Fares

from: to:	CARLISLE £	APPLEBY £	GARSDALE £	SETTLE £	SKIPTON £
Wakefield	10.00	8.20	6.70	5.60	4.20
York/Selby	10.00	8.90	8.20	7.20	5.40
Sheffield	15.50	9.80	9.10	7.70	6.00
Hull	16.50	11.50	10.80	9.80	7.70
Manchester (via Leeds)	12.00	10.60	9.80	8.60	6.50

SPECIAL EARLY BIRD OFFER — until 3 October
maximum cheap day return fare (Child 5 – 15 £2.50)
between any two stations on the line when making your outward journey by the 0630 Carlisle to Leeds anyday, Monday to Saturday, or the 0604 Leeds to Carlisle on Saturdays only. You may return by any train on the same day

SPECIAL OFFER ON SUNDAYS
maximum cheap day return fare (Child £3.50)
between any two stations on the line travelling on any train returning on the same day on Sundays until 1 November

£5 7 DAY ROVER TICKETS
OVER THE LEEDS-SETTLE-CARLISLE LINE
Freedom of the North West Rover, covering lines between Liverpool, Manchester, Leeds and Carlisle, costs £24.
(£15.85 for child/railcard)

£7
Freedom of the North East Rover, extends to Sheffield, Carlisle, Newcastle and Grimsby — all for £30 (£19.80 for child/rail card). Ask at your local station for details.

Metro
Day-Rover Metro Card and other Metro travel deals may be used on all trains between Leeds Bradford and Keighley. Details from local West Yorkshire Metro or BR Travel Centres or phone Wakefield 375555

PAPER 2   INFORMATION SHEET

RAIL SERVICES NORTHBOUND

BUS LINKS

RAIL SERVICES SOUTHBOUND

RAIL SERVICES NORTHBOUND

11 May 1987 to 15 May 1988

	MONDAYS TO SATURDAYS							SUNDAYS	
	SX	SO	F	F				A	B
London Kings Cross	–	–	0750	1000J	1330			–	1110
York	–	–	0745	0953	1153	1535		0748	1350
LEEDS	–	0604	0842	1042	1321	1625		0948M	1511
BRADFORD Forster Sq.	–	–	0826C	1030E	1259C	1625D		0935C	1505C
Shipley	–	0619	0841C	1042C	1305C	1641		0940C	1510C
Saltaire	–	0622	0843C	1045C	1307C	1644		0942C	1512C
Bingley	–	0627	0846C	1049C	1311C	1648		0946C	1516C
Crossflatts	–	0629	0848C	1051C	1313C	1651		0948C	1518C
Keighley	–	0635	0905	1106	1345	1657		1011M	1535
SKIPTON	0600	0650	0919	1120	1401	1711		1026	1550
Gargrave	0606	0656	–	1127	–	–		–	–
Hellifield	0616	0706	–	1136	–	–		–	–
Long Preston	0620	0709	–	1140	–	–		–	–
SETTLE	0626	0716	0942	1146	1421	1729		1046	1609
Horton-in-Ribblesdale	0637	0727	–	1156	1432	1740		1057	1621
Dent	0654	0744	1006	1213	1449	1757		1114	1639
Garsdale	0700	0750J	1012J	1219	1455	1803J		1120	1645
Kirkby Stephen	0720	0810	1031J	1239	1515	1822J		1139	1705
APPLEBY	0733	0823	1044	1253	1529	1836		1153	1719
Langwathby	0748	0838	–	1308	1545	1851		1208	1735
Lazonby	0754	0844	–	1315	1552	1858		1215	1742
Armathwaite	0802	0852	–	1323	1600	1906		1223	1750
CARLISLE	0821	0911	1127	1344	1622	1927		1245	1810
Glasgow Central	1120	1120	1305	1544	1830	2117		1519K	2111

RAIL SERVICES SOUTHBOUND

11 May 1987 to 15 May 1988

	MONDAYS TO SATURDAYS							SUNDAYS	
	H		F	F	F			B	A
Glasgow Central	–	–	0810	1050	1410	1550		–	1240
CARLISLE	–	0630	1005	1237	1615	1745		1024	1557
Armathwaite	–	0646	1022	1253	1631	1802		1041	1614
Lazonby	–	0654	1030	1301	1639	1810		1050	1623
Langwathby	–	0701	1037	1308	1646	1817		1058	1631
APPLEBY	–	0717	1054	1324	1702	1834		1115	1648
Kirkby Stephen	–	0733	1111J	1340	1718J	1851		1133	1704
Garsdale	–	0753J	1130	1400J	1738J	1910		1153	1724
Dent	–	0759	1136	1406	1744	1916		1159	1730
Ribblehead	0720	0809	1146	1416	1754	1926		1209	1740
Horton-in-Ribblesdale	0728	0818	1154	1425	1803	1934		1218	1749
SETTLE	0736	0826	1202	1433	1811	1942		1227	1757
Long Preston	0743	0833	–	–	–	1949		–	–
Hellifield	0746	0837	1210	–	–	1952		–	1805
Gargrave	0755	0846	–	–	–	2001		–	–
SKIPTON	0805	0857	1227	1457	1831	2012		1250	1823
Keighley	0816	0908	1238	1507	1842	2023		1301	1834
Crossflatts	0820	0929C	1242	1532C	1859C	2027		1314C	1906C
Bingley	0823	0931C	1245	1534C	1901C	2030		1316C	1908C
Saltaire	0827	0935C	1249	1538C	1905C	2034		1320C	1912C
Shipley	0830	0937C	1252	1540C	1907C	2037		1322C	1914C
BRADFORD Forster Sq.	0843D	0943C	1319D	1546C	1919E	2054D		1350E	–
LEEDS	0847	0934	1309	1534	1907	2056		1325	1859
York	0925	1025	1421	1625	2016N	2219		1545	2005
London Kings Cross	1203L	1210	1610	1813	2203	–		1729	2209

For notes see under Rail Services — Northbound

SETTLE/RIBBLEHEAD ROUND ROBIN TICKETS
Great Bargains for circular tours over the Settle–Carlisle line.
Available Mondays to Thursdays and Saturdays
(Not Saturdays in July and August)
From **LONDON**, Watford Junction and Milton Keynes — £25 (chld £15)
Travel by the 0730 ex-Euston to Carlisle, return to Kings Cross 1813
From **BIRMINGHAM**, Sandwell and Dudley and Wolverhampton — £18 (chld £10)
Travel by the 0725 ex-Birmingham New Street to Carlisle, arrive back 1841
From **GLASGOW** — out and back trip over the line — £15 (chld £9)
Any train outwards in time to return by 1625 from Leeds, Glasgow 2117
From the **NORTH** — Principal stations in Lancashire and West Yorkshire, plus Oxenholme, Penrith, Annan and Dumfries — £11 (chld £6).
Any train either way via Lancaster-Carlisle-Skipton
— From Chester, Crewe, Liverpool Lime Street, Manchester Victoria, Shrewsbury, Stafford, Stoke-on-Trent, Warrington and Wigan — £15 (chld £9)
Travel either way via Preston-Carlisle-Leeds
From the **NORTH EAST** — Principal stations between Hexham, Newcastle, Redcar and Thirsk — £14 (chld £7). Mondays to Thursdays only to 29 October
Any train either way via Newcastle-Carlisle-Leeds-York

Notes / Connections

A 17 May to 1 November 1987
B 5 July to 30 August 1987
C Change at Keighley
D Change at Shipley
E Change at Shipley and Keighley
F Light refreshments available on train until 3 October
G Change at Keighley — until 4 October only
H Does not run on Bank Holidays

J On some days buses connect with these trains — details opposite
K On 1 November arrives at 1654
L Change at Doncaster
M Departs Leeds 0933, Keighley 0956 from 11 October
N Arrives 1954 on Saturdays — until 3 October only
SO Runs on Saturdays only
SX Does not run on Saturdays

CONNECTING SERVICES SHOWN IN ITALICS

For additional trains serving stations between Leeds, Bradford and Long Preston see BR Timetable No 36 or local train guides and notices

Train services supported by Cumbria County Council, Carlisle City Council, Eden and Craven District Councils and Appleby-in-Westmorland and Settle Town Councils

For KIRKBY STEPHEN and BROUGH

Brough, Main Street	1010	–	1655	1800		
Kirkby Stephen, Market Square	1018	1100	1703	1808		
	1023	1105	1708	1813		
KIRKBY STEPHEN STATION Arrive Train time	1031N	1111S	1718S	1822N		
Depart	1035	1120	1722	1830		
Kirkby Stephen, Market Square	1040	1125	1727	1835		
Brough, Main Street	–	1133	1735	1843		

Days of operation: Tuesdays and Saturdays 12 May to 31 October 1987
Plus   Wednesdays and Fridays 1 July to 4 September 1987
Service operated by Grand Prix Services (telephone Brough 328)

For SEDBERGH

	SO	SO				
Sedbergh, Joss Lane	0715	–	0930	1700		
	0745	–	1000	1730		
GARSDALE STATION Train time	0750N	0753S	1012N	1738S	1803N	
Depart	0800	1020			1810	
Sedbergh, Joss Lane	0830	1050		–	1840	

Days of operation: Tuesdays 12 May to 1 September 1987
Plus   Saturdays 4 July to 5 September 1987
Service operated by J R Woof (telephone Sedbergh 20414)

For HAWES

Hawes, Old Station	0940	1330	1708			
	1000	1350	1728			
GARSDALE STATION Arrive Train time	1012N	1400S	1738S	1803N		
Depart	1020	1410		1810		
Hawes, Old Station	1040	1430	–	1830		

Days of operation: Mondays to Saturdays 11 May to 31 October 1987
Service operated by Burne's Taxis (telephone Leyburn 23280)

Notes
SO Runs on Saturdays only, 4 July to 5 September
S   Train southbound to Leeds }   See time tables opposite for details
N   Train northbound to Carlisle

For HADRIAN'S WALL/AUTUMN IN THE LAKES
Guided coach tour from Carlisle Station on SATURDAYS ONLY.
Hadrian's Wall   6 June to 29 August 1987
Lake District   5–26 September 1987
Departs Carlisle Station 1200 hours, returns 1600 hours
Fares: £4.50, children under 14 £3.50
Booking advisable: telephone Carlisle Tourist Information Office (0228) 25517
Service operated by Tysons of Cumbria

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PAPER 2   INFORMATION SHEET

CARLISLE

ARMATHWAITE

LAZONBY

Lazonby – the River Eden

The Lanes shopping centre

Brough Castle

CARLISLE: 'Border City' and historic bastion against the Scots. The ancient castle and cathedral are complemented by a new award winning shopping centre.

APPLEBY

Brough

BUS LINK

Kirkby Stephen

KIRKBY STEPHEN
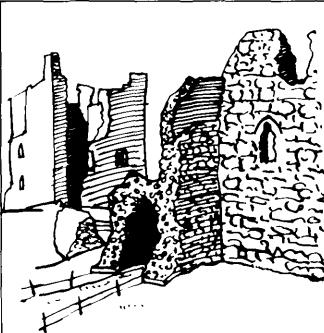
EDEN VALLEY: Fine scenic valley dominated by Cross Fell, highest point in the Pennines to the east, and with the Lake District to the west. Well known for its attractive villages, good pubs, riverside walks. Great views from the train as it passes through the Eden gorge between Lazonby and Armathwaite.

APPLEBY-IN-WESTMORLAND: Historic county town in a curve of the River Eden. The broad main street, with many fine buildings and pubs is the scene of a market every Saturday. At one end is the fine parish church, at the other a superb Norman castle, its grounds home to many rare animal breeds.

Wild Boar Fell 2324

Sedbergh

BUS LINK   GARSDALE

BUS LINK

Dent   DENT

Cowgill

Whernside 2415

RIBBLEHEAD

Ingleborough 2376

HORTON-IN -RIBBLESDALE

Pen-y-Ghent 2273

Hawes

WENSLEYDALE: The real 'Herriot' country provides great opportunities for walkers. See the waterfall at Hardraw Force; visit Hawes for the Upper Dales Folk Museum in the restored former rail station – or just browse round its little shops and galleries – and market on Tuesdays. Don't forget the rest of Wensleydale – full of attractions!

Dent Village

RIBBLEHEAD: Famous for its massive 24 arch viaduct which carries the railway northwards towards Blea Moor – and the longest tunnel on the route. Overlooked by the famous 'Three Peaks' – centre for the fascinating limestone landscape. Be ready to walk – only southbound trains stop here!

SETTLE: Near the start of 'The Long Drag' – the climb of the railway up Ribblesdale. Small lively town sports a Tuesday market in front of the Town Hall and below the limestone crag of Castlebergh. Start here for walks in superb limestone scenery, including Malham Cove and Gordale Scar.

SKIPTON: 'Gateway to the Yorkshire Dales' – a historic market town and ideal centre for exploring the Settle–Carlisle railway. A fine castle and church dominate the broad main street which hosts a daily market (except Tuesdays.) Slightly hidden away are fine pubs and interesting canal side walks – and boat trips.

SETTLE

LONG PRESTON   Malham

HELLIFIELD

GARGRAVE

Skipton – the canal

SKIPTON

KEIGHLEY

CROSSFLATTS

BINGLEY

SALTAIRE SHIPLEY

BRADFORD

LEEDS

What do the students and teachers think?

While preparing this module we obtained the views of students in a few of the trial classes by tape recording interviews with small groups.

The following interview took place while a class of 'low ability' 4th year secondary students was working on Stage 3 of the module. Four students (S1, 2, 3, 4) were interviewed; each was chosen from a different group in the class. The interviewer was not the class teacher but a 'friendly, interested but uninformed observer'.

I: So where are you all going?

S1: Skegness.

I: What have you done so far?

S1: Made a big list out, seeing what jobs we've got to do; then we tick which ones we've done so we know if we've missed out any . . . we've got to phone the coaches up. Then there's the trains.

S3: There's a problem. We need to get a train that leaves early in the morning and one that leaves at a reasonable time in the afternoon, but yesterday they said the earlier trains were too late for us, I've go to check that now.

S3: The first time we had to phone, I said 'I'm not phoning, I'm not phoning!' but half way through you get used to it, kind of thing, so when you leave school and you want to phone up for a job say, you don't feel so bashful.

S2: It gives you more confidence.

S1: Yes.

I: Would you think of doing something like this . . . planning a trip yourselves in the holidays.

S2: Yes, there's two people in our year planning to go youth hostelling.

S1: But if we went it wouldn't be planned like this. We'd just go!

I: Is it worth planning, then?

S1: Yes because if you don't you're bound to forget something!

S3: It's more organised.
(S4 runs into the classroom.)

I: What's happened now?

S4: We've just been phoning up coach companies and the cheapest was £100. We've found one for £90 for a 20-seater. We've rung round quite a few. Some are too expensive. Some are not there anymore. Gone bust or something!

I: Would that be worth considering . . . the £90 coach?

S4: We'll need a calculator!

S1: There's two maths groups . . . some may come from the other class . . .

Notice the involvement, autonomy, growth in confidence and the natural way in which mathematical activity is beginning to arise.

The following unsolicited letter vividly illustrates the tensions that many teachers feel as they attempt to encourage such student autonomy through real problem solving.

'I found it very difficult not to intervene and direct work to begin with. It took me a while to realise what I intended as open-ended suggestions like 'Have you thought of trying . . . ?' were simply interpreted by the students as 'Do this!' It was difficult to stand back and allow them to make mistakes or explore blind alleys.

I found I had to simply grit my teeth and survive the noise, arguments and apparent chaos of the first few lessons but gradually we all became much more relaxed and involved in the activities, and things settled down considerably.

The students initially complained that we were not doing 'proper maths' but as they became more involved in the modules and discovered they enjoyed doing the work, the complaints became less frequent. Now after four modules I think they are beginning to see that in fact they have developed some very valuable skills through the work and that it may be of more use to them than 'proper maths'.

Using the Numeracy Project has had a significant impact upon my relationship with the class. I feel I know the students much better than I have ever done in an equivalent class and that in many ways they relate to me much more as a friend than as a teacher. I am sure this is because they have taken responsibility for their own learning and have had to make and live with decisions which have affected the whole class. I have certainly discovered talents and personal qualities in many of them which would never be revealed in a traditional maths classroom. A below average maths class has been transformed into a very impressive and interesting group of young people — or perhaps they always were?'

Finally, if you have any views or experiences on your work with this module, we do hope you will let us know.

Checklist for the teacher

Real problem solving demands a different balance of teaching styles and strategies from the traditional curriculum. Students need to learn how to

- assume more control of, and responsibility, for their work
- share and develop ideas with each other
- give and accept constructive criticism
- turn their own ideas into actions, and to learn from the consequences of their own decisions.

To effect this change of roles, it is helpful if the teacher can:

Frequently

- praise achievement

  Those seem to be really good ideas.

- encourage groups to think further and deeper

  Can your trip cater for people who don't like sport?

- ask clarifying questions

  Can you explain that to me again? I didn't quite understand.

- agree targets

  Do you think you could finish your rough plan by Monday?

- encourage students who lack confidence.

  Tell me what you'll say on the phone . . . Good, I'm sure you'll be O.K.

Occasionally

- make a suggestion if a group is running out of ideas

  Why don't you visit the tourist information office after school?

- divert a group from a particularly unhelpful idea

  Do you *have* to spend that much on transport?

Avoid

- taking over a problem

  I'll phone the station for you if you like.

- making negative comments

  You're being much too ambitious.

- determining whose view is accepted.

  Sarinda's idea seems to be the best.