Support for Functional Skills Mathematics

Level 1

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OCR
RECOGNISING ACHIEVEMENT

Support for Functional Skills Mathematics
Level 1
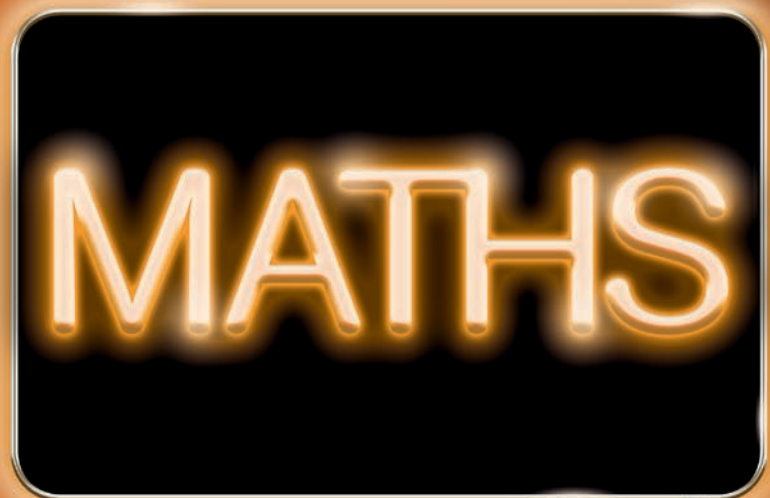
The School Mathematics Project

Contents

Level 1

Introduction

What these support materials aim to do

They have been written to support teaching that leads to OCR's Functional Skills Mathematics Level 1 qualification, which consists of tasks set in everyday contexts needing mathematics for their solution. Although such tasks look straightforward, the evidence from the pilot suggests that learners needed significant preparation in order to achieve the qualification.

A teaching resource graduated by difficulty

To meet this need we have developed 21 tasks (on pages 14–73). They are designed as a teaching resource rather than as practice assessments – though you might wish to use some of them that way. They are in approximate order of demand: the first tasks, marked ●○○, require basic interpretation and representation skills and will probably take less than a lesson; the tasks marked ●●○ progress towards the Level 1 standard; the large group of tasks marked ●●● roughly match the demand of the Level 1 assessment, may take longer than a lesson and in places contain work that provides appropriate challenge for some learners by going a little beyond Level 1. Our order of difficulty is only a guide, particularly as the different parts of a task can vary significantly in demand. Feel free to change the order of tasks if you think that's right for your teaching groups. You may also want to modify the difficulty of individual tasks by providing support (particularly in the early stages) or adding challenge.

Fitting the tasks into the curriculum

The tasks are intended to be embedded in a scheme of work over a significant period of time. As part of a mathematics course they can support, and be supported by, more conventional work. Equally, the practical contexts that they are set in make them suitable for use in vocational courses, either as they are or after being customised to the vocational setting.

It is not essential to do all the tasks: a selection can be made to suit the teaching group.

The format of the tasks

The problems to be solved are presented on reproducible sheets, with necessary information (of the kind that you might find in a product leaflet or website) incorporated as it is needed. Learners must choose the information required, process it appropriately and accurately, then present their responses clearly.

As the sheets are available in PDF format you can project them and draw the attention of the class to important features.

We provide brief teaching notes on a sheet before each task; this lists any resources that are needed, gives suggestions for 'lead-in questions' (see pages 5–6) and provides teaching points that have arisen from the piloting of the tasks, together with suggestions for related web searches. There is plenty of space on the teaching notes sheets for you to add your own ideas.

Other key teaching material

'Reality check' (pages 10–13) is teaching material for use at any time alongside work on the first ten or so tasks: short items preceded by teaching notes encourage learners to think self-critically about misconceptions and errors, particularly those that lead to unrealistic conclusions. The items are not intended to be done all in one lesson.

Marking

We have not provided 'answers' to the functional mathematics tasks. This is because a single short answer is not what needs to be given credit: learners' working and explanations are as important – and for some tasks alternative responses are valid.

By far the best way to be ready to mark one of these tasks is to work through it yourself, noting what you think will be key points of difficulty.

See pages 6–7 for more on marking.

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Responding positively to learners' difficulties

The teachers[1] who piloted draft versions of the tasks were early participants in the OCR Functional Skills Mathematics Level 1 pilot. The following suggestions for responding positively to learners' difficulties have benefited from the insights they gained from that experience.

At first learners find tasks like these unfamiliar and are resistant to them.

In a variety of school and college classes, but particularly in mathematics lessons, teachers are accustomed to setting – and learners accustomed to answering – elementary mathematical problems that have the following characteristics.

- All the data needed is given in the statement of the problem.
- No unnecessary data is given.
- The techniques needed are predominantly numerical calculations.
- There is a single acceptable answer.
- The answer is usually a numerical quantity.

Usually it is expected that learners will decide what familiar mathematical operations should be applied to all the data given, and then apply them correctly – that and no more.

There can be good reasons for setting tasks with these characteristics. But a moment's thought tells us that very few real-life problems needing mathematics for their solution possess them; instead the following are likely to apply.

- Not all the necessary data comes with the problem: the real-world problem solver has to find some or all of it and may have to make reasonable assumptions where facts or values aren't available or can't be known.
- The data that's needed is mixed in with data that's not: the problem solver must choose what to use.

- As well as calculating, the problem solver may need to create and interpret tables and graphs, match, fit and compare data, and apply reasonable weightings to data.
- A range of answers may be valid, either because different ways of 'modelling' the situation are suitable or because an input that must be assumed can take a range of values.
- The answer may be advice on action to be taken, a chart or a design …

'Functional mathematics tasks', as we've come to call them, usually have at least some of these last five characteristics; so it is not surprising that learners find them unfamiliar and are reluctant to deviate from the way they have responded in the past to conventional 'problems'.[2]

Discussion between you and your learners, as well as within groups of learners, is essential in developing an understanding of why work of this new kind is important.

Learners have trouble making sense of the situation and information in the task.

From your knowledge of the class, consider whether a more immediate and tangible experience of the situation is needed before you start the task: research evidence suggests that activities where learners play roles like those in a task can be very powerful in helping them do well when the task is presented in written form. We give suggestions for role play of this kind in the notes to some of the tasks.

When you are ready to start the task, first give out (or project) the sheet(s) and ask the class 'lead-in' questions that will familiarise them with the data: these can involve such things as extracting information from a written paragraph, interpreting a table (especially one in an unfamiliar format) or making a simple one-step calculation. We provide a few examples of lead-in questions in the brief

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[1] This material was piloted, and is intended to be used, in a range of educational institutions and contexts, including those where terms such as 'tutor' and 'lecturer' are appropriate rather than 'teacher'. We use 'teacher' to cover all such roles for the sake of brevity and not in any way to suggest a limited view of the range of professionals whom we aim to support.

[2] For an account of research addressing the 'didactical contract' associated with conventional word problems and its impact on learners' responses to realistic problems see Verschaffel, L., Greer, B., and De Corte, E. *Making Sense of Word Problems*. Lisse, The Netherlands: Swets & Zeitlinger 2000.

teaching notes that precede each task: you can adapt these questions and make up more of your own if you need to. But try to avoid this session turning into an explanation of how to do the task.

Occasionally there will be signs that learners are not ready for the task; if so, be prepared to set it aside, reflect on where the learning difficulties lie and return to it at a later date after you have supplied them with learning experiences that will help them relate techniques to the context.

Learners still find it daunting when they are faced with the written questions

Often the difficulty lies in picking out from the authentic information just those bits that are needed to complete the task. So it can help learners if they read through the task steadily, marking on the sheet with a highlighter pen the information they think they will need.

Whether or not you've previously involved the class in role play, it can be highly effective at this stage to ask them to think of themselves as being the person faced with the problem: 'Put yourself in their position: what would you do?'

It can be effective to get the class working together in pairs or small groups to review the task and decide what has to be done. You can then have them work in groups to complete the task or work individually.

Encourage them to get started with some sort of sketch, table or chart on which they record what they know about the problem; this can give them some structure that will build confidence.

In the Functional Skills English Level 1 assessment learners are similarly expected to extract key ideas from a source and a similar reading level is required: it may be worth looking at some past papers for that assessment – if possible alongside colleagues who teach functional English, with whom you may be able to share ideas.

Learners feel insecure when there can be more than one answer to a task.

In line with our earlier comments about real-life problems, in many of the ●●● tasks there is latitude in what is acceptable as an answer because an assumption or judgment is required.

Emphasise that learners must write down their assumptions, their judgments and their reasons for making them, so that anyone reading the response can decide whether they think the solution follows logically from the data and reasonable assumptions.

They don't want to write much down.

Explain they must state the information they have picked out from the sheet and show full working to justify their conclusion, which also must be clearly stated.

On the next page there is a checklist showing elements that should be present in a clear response to a functional mathematics task. These elements correspond with the features that examiners give credit for in their mark schemes for the formal assessment.

Some tasks, by their nature, do not require all the elements listed.

You can project the checklist when you want to emphasise these elements in class; and you can print it out as a sheet that learners can keep in their work folder or exercise book, to refer to during the course.

When marking you can have the checklist by your side. Note though that the elements it lists are not intended to have equal weight in evaluating tasks; in any case it is more valuable when introducing a new educational approach to put a note on a learners' work pointing out which of the required elements are missing than to be too concerned about awarding a numerical mark.

The checklist can be used for peer checking of work.

I'm not confident that learners will retain the ability to work this way.

After the class has completed a task satisfactorily, build confidence by reviewing with them what they have learned while doing it; this might include

• having learned to go through information and pick out what is needed for a task of this kind

• having used a mathematical skill in a new situation

• having encountered some pitfall, which they now know how to avoid in the future

Level 1

Learner's response checklist

Your response to a Functional Skills Mathematics Level 1 task should contain most of these.

1 The information you have used from the sheet(s) (Say clearly what it is.)

2 Evidence of correct mathematical procedures:
   - When you perform a calculation, either in your head, on paper or on a calculator, write down the calculation you do.
   - Your calculations need to be correct so check (and show this check) whenever you can.

3 The correct units in your results (cm, £, kg and so on)

4 Results that are rounded in a way that suits the task:
   - If a decimal is needed, use a realistic number of decimal places.
   - If the answer is an amount of money, don't leave a decimal part of the pence.
   - If the answer is a length of time, decide whether it's realistic to give it to the nearest second or minute, or some other degree of accuracy.
   - If the answer is a number of objects, this usually needs to be a whole number; look back at the task and think whether you need to round up or round down in this situation.

5 Answers that match the question:
   - Look back at the question: are you required to give a cost or other quantity, advise on a decision, present a scale drawing, planning chart or travel plan – or something else?
   - If you arrive at your answer from a calculation, explain how.
   - If you have had to make an estimate or a judgment, say what it was.
   - If your answer is a quantity, check that its size makes sense in real life. If you have any doubt, check that your method makes sense. Have you switched units in the middle of your working – for example from working in pounds to working in pence? Have you forgotten to multiply or divide by some important quantity?

Level 1

Addressing your own and colleagues' concerns

The teachers who helped develop these materials told us about the concerns they felt when they first started preparing learners for the Functional Skills Mathematics pilot and how they dealt with them. Some of the teachers were managing the introduction of functional mathematics across a whole school or college, so they had responsibility for advising and supporting colleagues. What follows is based on their experiences.

I'm unfamiliar with tasks like this and not sure how learners will respond.

The tasks have been piloted in a variety of learning institutions and teachers have been very positive about the outcomes. They found the best preparation for presenting a task to a class was to work through it themselves: this made them more aware of the difficulties learners were likely to encounter and the assumptions they would have to make. You'll find the new teaching approach becomes easier as you gain experience and learners come to realise what's expected.

There is no initial assessment for functional skills in maths so I don't know where to begin.

A short pre-test cannot do justice to functional thinking. But the tasks are in a rough order of difficulty, so you can pick out some easier ones to try with learners first. Then, depending on their response and the amount of support you need to give, you might stay with tasks at that difficulty level or jump to harder ones. Building up a knowledge of each learner's capability informs effective teaching.

I worry about the time this will take when there is so much else to cover and not enough time allowed on the timetable.

It's much better to start functional mathematics early with learners and blend it in with more familiar ways of teaching on a 'little and often' basis. Some of the simpler tasks can take as little as ten minutes. You don't need to do all the tasks but it is important to choose a variety of types.

I'm the member of staff responsible for functional maths. I'm starting to spend a lot of planning time going into some depth with it and I find my teaching groups gain from this, but I can't expect colleagues who have just a bit of it on their timetable to devote that much time.

This can be a particular concern in colleges where functional skills are taught through the medium of vocational subjects. It's worth going through each vocational scheme of work with the vocational lecturer(s) involved: you may well find that a very large proportion of the vocational scheme of work will be enhanced by attending to functional mathematics aspects.

My learners won't have enough everyday knowledge of the contexts the tasks are set in.

That was seldom a difficulty in the piloting, and when it was it could usually be sorted out by discussion. The time required to discuss the functional element can be difficult to predict and it can become substantial; but be careful not to curtail such discussion when it is going well: it can raise learners' motivation as they take ownership of the problem, and this can lead to greater success with the tasks.

There are plenty of tasks in varied contexts to choose from so selecting some that fit with learners' practical courses or personal enthusiasms can help a great deal. Customising the tasks to local situations also works well and we include ideas for this in the notes on some individual tasks.

In discussing those contexts that involve spending or saving significant amounts of money you may need to bear in mind that financial hardship is an embarrassment to some learners.

How do I help learners progress towards Level 2?

Level 2 tasks are presented in a less structured way than Level 1 tasks. Where learners seem sufficiently confident, you can add some challenge to Level 1 tasks by presenting them with less structure.

Mathematical skills and knowledge

At this level the Functional Skills Standards specify content and skills equivalent to national curriculum mathematics levels 1–4, the Adult Numeracy Standards and application of number key skill, level 1.)

In the tasks, certain mathematical topics recur and if learners are insecure with them their success on the tasks will be limited. These topics include

- money calculations with a calculator, including: working in pounds and interpreting a decimal result as pounds and pence; working in pence and interpreting a decimal result appropriately
- rounding in a way that suits the context
- time and date facts (days in a year, weekdays in a year, hours in a day) and reasoning about time and dates
- reading a travel timetable
- calculating with lengths
- working with a mixture of units (for example mm and cm, MB and GB, g and kg)
- using formulas expressed words

The following topics are assumed to be understood but occur less frequently.

- finding a mean
- finding the area of a rectangle
- currency conversion

The teachers who contributed to developing these materials often wanted to link the teaching or revision of such topics very closely to functional tasks that depended on them. This happened in two ways: there was a tendency (especially when dealing with lower-attaining learners) to want to spend the lesson before a task going through the techniques that would be needed; equally, when a mathematical topic had been studied over several lessons, a functional task that depended on it was seen as a good way of rounding off the work.

Wanting to do this is understandable: the first approach can contribute to a trouble-free session doing the functional task and a consequent boost to learners' confidence; the second establishes that the techniques just studied have a practical purpose.

The disadvantage of such close linking is that it doesn't reflect the way functional skills have to be deployed in real life: later when your current learners need to solve a problem, you won't be around to give them some preparatory coaching on the techniques. And you won't be able to focus in on all the required skills immediately before the formal assessment.

So we suggest instead moving towards the following approach, which requires a longer timescale than was available during piloting:

- Make sure techniques are dealt with thoroughly in your scheme of work before you set a functional task that depends on them.
- When learners have grasped a technique, encourage them to talk about the familiar contexts it can be used in, so they start to see each technique as part of a growing toolkit for future use.
- Continue to revise such techniques on a 'little and often' basis, at the same time keeping the 'usefulness' ideas alive.
- Start this process of developing 'techniques with a purpose' early; don't think of it as something to be done just in the run-up to the functional mathematics assessments.
- When setting functional tasks (other than in formal assessment conditions) encourage learners to look back through their exercise books and textbooks – or search for digital resources – to find any technique they've met in the past and now need; don't do this work for them.

Reality check

Notes

Essential resources

calculators

Points to note

■ The twelve items on the following three pages are intended to be used at convenient times alongside the first ten or so functional mathematics tasks. The items contain examples of errors that learners commonly make in work of this kind. The intention is that learners find the error in each item, correct it and comment on it, and thus become more aware of the risk of making that sort of mistake in their own work.

■ The items are not meant to be used all in one go. It is much better for the class to do a few, then after time has elapsed come back and do some more. One of the teachers who helped with the piloting cut the pages into separate items and organised them into a 'carousel' for groups to use. Another teacher projected individual items for class discussion.

■ The errors include choice of the wrong numerical operation, doing an operation like division the wrong way round, forgetting to multiply or divide by an important value and getting mixed up with units of measure. Since such errors can lead to grossly unrealistic results learners should always check each answer is sensible. However in some contexts learners may not know what a sensible answer would be: £97.25 for a cup of tea and sandwich in item A would make many of them suspicious but some would be content with £1606 for a year's tea in item G. The point is that the stages of the method must be checked for plausibility, not just the answer.

■ Other items contain mathematically conventional working but a solution that fails to reflect the realistic nature of the problem. This includes omitting to consider whether the situation requires the answer to be rounded up or rounded down. More striking cases are items I (planks) and L (rope). Research on similar plank tasks has shown that many learners are strongly wedded to doing things the way they have always done in mathematics lessons, regardless of having now produced an answer that's of no practical use: asking them instead to draw a sketch of the planks and show how the cuts will be made can help; asking them to imagine themselves being the person cutting up the planks ('What would you do?') also helps; providing the actual planks and a saw is apparently very effective! By contrast, the conventional answer to the rope task ('8 pieces') does have significance: it is the lower bound of a realistic answer (such as 'More than 8 pieces, to allow for the knots' or '9 pieces, assuming that the knots …'). Again, if your learners cannot get past the conventional working, ask them to sketch the situation or think what they would do if they were Marcel stretching the rope.

Reality check

Here are some problems with solutions that are not correct.
Find a correct solution for each problem.
Compare your solutions with someone else's.

A

Meera buys a cup of tea that costs 95p and a sandwich that costs £2.25.
How much does she spend altogether?

> *95 + 2.25 = 97.25*
>
> *So she spends £97.25.*

B

Hattie has a full bag of plain flour that weighs 1.5 kg.
She measures out 120 g of flour.

How much flour is left in the bag?

> *1.5 × 100 = 150*
> *150 − 120 = 30*
>
> *So 30 g of flour is left.*

C

Five friends are out for a meal.
They decide to share the cost of the meal equally.
The total bill is £66.34.

They want to know how much each should pay.

> *66.34 ÷ 5 = 13.268*
>
> *So each pays £13.268.*

D

Heather earns £28 000 per year.
She earns £5000 per year more than Gordon.

How much does Gordon earn per year?

> *28 000 + 5000 = 33 000*
>
> *So Gordon earns £33 000 per year.*

E

A box of cereal weighs 750 g.
Julie eats 60 g of this cereal each day.

How long will one box of cereal last her?

> *750 × 60 = 45 000*
>
> *So the box will last her 45 000 days.*

F

Joe works part-time 3 days a week in a school.
The cost of his bus fares each day is £3.20.
The summer term is 13 weeks long.

How much will Joe spend on bus fares for the whole term?

> *3.20 × 13 = 41.6*
>
> *So the cost of the bus fares will be £41.60.*

G

Hayley has one cup of fruit tea in the afternoon each day.
She works out that each tea bag costs 4.4p.

She wants to know how much she will spend on this fruit tea in a year.

> *There are 365 days in a year.*
> *4.4 × 365 = 1606*
>
> *So the cost of the tea will be £1606.*

H

Ken has a recipe for summer fruit dessert.
Here is the list of ingredients.

> **Summer fruit dessert**
> Serves 6
>
> 3 peaches
> 6 apricots
> 6 large plums
> 225 g blueberries
> 175 g raspberries
> 50 g sugar

He wants to know how much sugar he needs for a fruit dessert for 12 people.

> *50 × 12 = 600*
>
> *So he needs 600 g of sugar.*

I

Zoya has 4 planks, each 3 metres long.
How many planks 2 metres long can she saw from them?

> *4 × 3 = 12*
> *12 ÷ 2 = 6*
>
> *So she can saw 6 planks.*

J

A group of 210 students is going on a school trip in buses.
Each bus can carry 48 students.

How many buses will the school need to hire?

> *210 ÷ 48 = 4.375*
>
> *So the school will need to hire 4 buses.*

K

Colin pays £250 each year to be a member of a swimming club.
How much does he pay for each week?

> *There are 52 weeks in one year.*
> *52 ÷ 250 = 0.208*
>
> *So he pays about £0.21 each week.*

L

Marcel needs a rope 20 metres long to stretch between two buildings.
He only has shorter pieces of rope.
Each of these pieces is 2.5 metres long.

How many of these pieces of rope will he need to use?

> *20 ÷ 2.5 = 8*
>
> *So he will need 8 of these pieces of rope.*

1 Art class

Notes

Examples of lead-in questions

Which days does Stevie prefer?

What does Sam do on a Monday?

Points to note

■ It can help learners if they mark key facts in the emails with a highlighter pen.

■ Many learners naturally draw up a table to summarise the data, without any prompting from the teacher. They also come up with their own ways of distinguishing between an evening that definitely suits a member and one that is less suitable.

1 Art class

Owen runs an art class.
There are 10 class members.

They currently meet on Wednesday evenings in a village hall.
The hall is not free any more on a Wednesday.
Owen sends them all this email.

From: Owen Troy <owen@artmail.com>
To: Wednesday's Art Class
Date: Thursday 28 May, 2009 8:30 pm
Subject: New evening for class

Hi all,

We agreed last night we would look for another evening for our art class.
We can have the hall on a Monday, Tuesday or Thursday.
Can you email me next week with your preferences and I will try and find the evening that suits us best.

All the best,

Owen

Their emails are shown on sheet 2.
Owen is happy with any evening.

(a) Use the emails to decide which evening he should choose for the art class.
Show clearly how you made your decision.

(b) Write a short email that Owen could send to the group explaining briefly why this decision was made.

Hi Owen,

I can only make Tuesdays or Thursdays.
I have to take my son to band practice on Monday.

Love from Sam xxx

Hi,

Monday is my favourite though I could come sometimes on a Tuesday.
I can't come on a Thursday. I look after my grandson.

Fiona

Hello Owen,

I prefer Mondays.
I can do Tuesdays or Thursdays but it is not so convenient.

Cheers, Jameel

Hi Owen,

Monday is best for me.
Tuesday is impossible.

Ky

Hi Owen,

I've got swimming club on a Thursday.
My favourite would be Tuesday.
I can do Monday but it would be a bit of a rush.

John

Hi Owen,

Monday or Tuesday is best for me.
Thursday is OK though.

Love, Stevie

I can make any evening.
But I might be moving soon so just forget about me.

Yours, Kevin

Hi Owen,

My partner works most nights during the week so I can only do Thursday.

All the best,
Chris

Dear Owen,

Any night is fine with me but Monday is best.
I love your class!

Yasmin

Hi Owen,

I'd like Monday please.
My partner works on a Tuesday evening so I can't do that.
I could do Thursdays but I would have to pay for a babysitter sometimes.

Sue

2 Compliment slips

Notes

Essential resources

calculators

Examples of lead-in questions

How much will it cost to get 5000 of these compliment slips printed?

How much is the postage for 1000 slips?
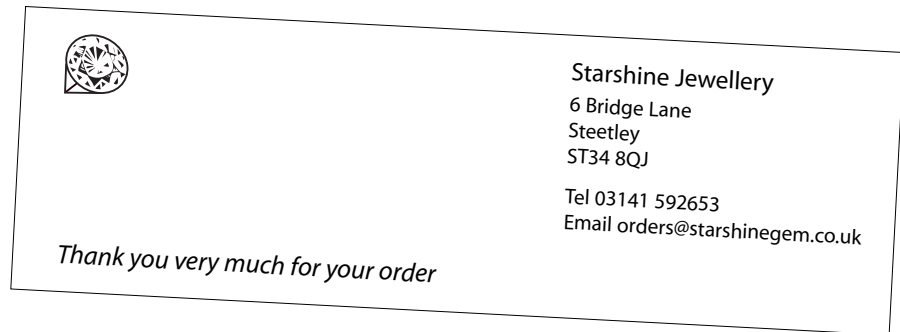
Point to note

■ This work gives learners experience in interpreting a table, a process that is not always straightforward (see also 'Calendars' on pages 24–25, where the prices are per item, rather than for a quantity as here).

■ Some learners may not know that P & P stands for postage and packing.

■ Similar work could be based on price tables in other vocational areas.

2 Compliment slips

Companies that sell things by mail order sometimes include
a compliment slip in each package.
This is a piece of paper that tells the customer who the package is from.
It could include a message like 'Thank you very much for your order'.

Starshine Jewellery
6 Bridge Lane
Steetley
ST34 8QJ

Tel 03141 592653
Email orders@starshinegem.co.uk

Thank you very much for your order

Coolprint is a company that prints compliment slips.
The cost of their compliment slips is shown in the table below.

Full colour compliment slips (210 mm × 99 mm)					
Quantity	50	500	1000	2500	5000
Price	£19.99	£49.99	£59.99	£89.99	£119.99
UK P & P	£5.00	£10.00	£10.00	£10.00	£10.00

(a) Geoff wants to order 2500 of these compliment slips.

    (i) How much will the slips cost (not including postage)?

    (ii) How much is the postage?

    (iii) What will be the total cost of the compliment slips?

(b) What will be the total cost of ordering 50 of these compliment slips?

(c) Shazia sells her own home-made chutney.
She orders 500 of these compliment slips which she hopes will last her a year.
She runs out after eight months and orders another 500 slips.

    (i) How much in total does it cost her for the two orders of compliment slips?

    (ii) How much cheaper would it have been if she had ordered all these slips
at once?

3 Longleat   Notes

Essential resources

calculators

Examples of lead-in questions

Hira is 70 years old.
How much will it cost her for a passport ticket?

Jim is 55 years old.
How much will it cost him to visit the safari park
without a passport ticket?

Julie is 1.1 metres tall.
Would she be able to go on the teacup ride?
How much does it cost to go on the teacup ride
without a passport ticket?

Sam is 12 years old and is 1.5 metres tall.
Can he go on the motion simulator?

George is 8.
He and his dad visit Postman Pat village.
They don't have passport tickets.
How much does it cost them?

Point to note

■ Some learners will feel that it is always worth
buying a passport ticket as you can then visit any
attraction you want to without paying any extra.
This is a valid response if supported by reasons.

3 Longleat

Longleat safari park is in the grounds of Longleat House between Bath and Salisbury.
There you can see lions, tigers, giraffes, rhinoceroses and other wild animals.

There are other attractions including a railway
and a hedge maze.

A passport ticket gives you entrance to
the safari park, Longleat House and its grounds,
and all the other attractions.

2009 prices	Adult	Child (3–14 yrs)	Senior citizen (60+ yrs)
Passport ticket	£23.00	£15.00	£17.00

Elsie and her nephew Ed are planning a visit to Longleat.
Elsie is 39 and Ed is 10.

(a) How much would it cost them in total for passport tickets?

If you don't buy a passport ticket then you pay for each attraction separately.

Attraction	Adult	Child (3–14 yrs)	Senior citizen (60+ yrs)
Safari park	£12.00	£8.00	£9.00
House and grounds	£12.00	£6.00	£7.00
Grounds and gardens	£4.00	£2.00	£3.00
Adventure castle *	–	£4.00	–
Old Joe's mine	£3.00	£3.00	£3.00
Railway	£4.00	£4.00	£4.00
Motion simulator **	£3.00	£3.00	£3.00
Pets' corner	£5.00	£5.00	£5.00
Postman Pat village *	–	£3.00	–
Safari boats	£4.00	£4.00	£4.00
Hedge maze	£3.00	£3.00	£3.00
Teacup ride **	–	£1.00	–

2009 prices

*   Children will be admitted only if they are aged 14 years and under.
    Adults/seniors will be admitted, free of charge, only if accompanying a child.

** A **minimum** height of 1.2 m (4 ft) applies on the motion simulators.
    A **maximum** height of 1.2 m (4 ft) applies on the teacup ride.

Elsie asks Ed to write a list of
what he wants to do.
Here is his list.

> *For Aunt Elsie*
>
> *Safari park*
> *Adventure castle*
> *Railway*
> *Pets' corner*
>
> *Ed x*

(b) (i) How much would these attractions cost Ed without a passport ticket?

   (ii) Is it worth him having a passport ticket?
       Give a reason for your answer.

Elsie is happy to go with Ed to all the attractions on his list.

(c) Should Elsie buy a passport ticket?
    Show clearly how you made your decision.

4 Hair appointments

Notes

Examples of lead-in questions

How much time will the salon allow for a colour and cut with a conditioning treatment?

Rubina is booked in for a cut and blow-dry at 10:30 a.m.
What time should she be finished?

Points to note

■ Although this is the first planning task in these materials and learners are not guided by a series of steps, most who piloted it did well on it. Some, however may benefit from first doing some role-play where learners take turns to select the treatments they require from a list and another learner records these bookings on a timeline or grid.

■ In doing planning tasks of this kind, learners should soon realise that the least flexible requirement (in this case Poppy's perm and cut) needs to be fitted first.

■ The task and preparatory role-play can be adapted to other vocational areas (dentist appointments, personal training sessions, tennis or squash court bookings).

4 Hair appointments

Emma works in Snippets, a hairdressing salon.

They allow these times for cuts, colours and treatments.

	Time
Cut and blow-dry	1 hour
Colour	1 hour
Colour and cut	2 hours
Highlights	1 hour
Perm and cut	2–3 hours
Conditioning treatment	10 minutes
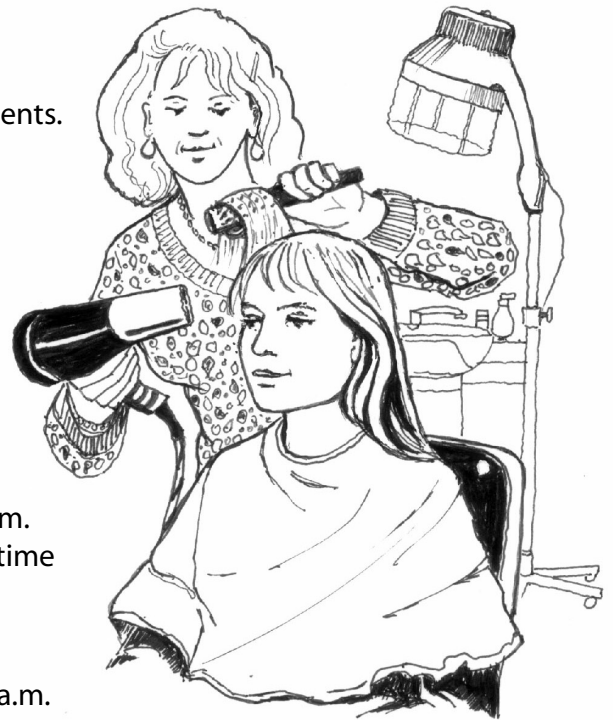
On Mondays Emma works from 9:00 a.m. to 5:30 p.m.
She usually takes a half-hour break for lunch sometime
between 12:00 noon and 2:30 p.m.

For Monday she already has these two bookings:

- Kelly booked in for a cut from 9:00 a.m. to 10:00 a.m.
- Shari booked in for a cut from 4:30 p.m. to 5:30 p.m.

She receives the following emails from three of her clients.

> Dear Emma,
>
> I'd like to come for a cut and blow-dry with a conditioning treatment on Monday.
> I can come any time. Please let me know when you can do it.
>
> Thelma

> Hi Emma,
>
> I'd like to come on Monday for a colour and cut.
> I can come any time as long as I am finished by 3 p.m.
> Hope you can do it. Thanks.
>
> Hayley

> Emma,
>
> Any chance of me being able to have a perm and cut on Monday morning?
>
> Poppy

Emma always allows $2\frac{1}{2}$ hours for Poppy's perm and cut as her hair is medium length.

- Can Emma fit these three clients in on Monday?
  When should she tell each one to arrive?

5 Calendars

Notes

Essential resources

calculators

Examples of lead-in questions

Helen orders 5 calendars.
What will be the cost of each calendar?

Salim orders 4 calendars.
What will be the cost of each calendar?
What is the total cost of these calendars?

Pete orders 12 calendars.
What is the total cost of these calendars?

How much would first class postage be for 30 calendars?

Points to note

■ Learners may be confused by the fact that prices are given per calendar but the postal charge covers all the calendars in an order.

■ Part (c) is included as an extension task.

■ In part (c) the calculator result for 19 calendars is 332.8; learners need to understand why this has to become £332.80 (and not left as it is or written, for example, as £322.08).

■ Similar work could be done using price lists in other vocational areas.

5 Calendars

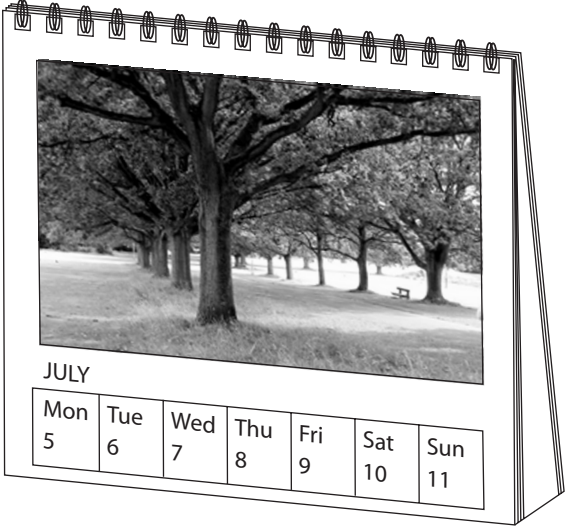Photocard is a company that prints a variety of cards, calendars and gifts from digital photos.
This information is from their website.

Deluxe desk calendar

This free-standing calendar has black metallic spiral binding.
Just flip the pages over to reveal a different photo for each week of the year.
Printed on premium card.
An ideal gift for family and friends.

Price information

Quantity	Price each
1–4	£17.99
5–19	£16.99
20+	£15.99

JULY

Mon 5	Tue 6	Wed 7	Thu 8	Fri 9	Sat 10	Sun 11

Postal charges

Quantity	1	2–9	10–19	20–49	50+
UK first class	£3.99	£4.99	£9.99	£14.99	£19.99

(a) You want to order 4 deluxe desk calendars.

   (i) What will be the cost of one of these calendars?

   (ii) What will be the cost of the 4 calendars?

   (iii) What will the UK first class postage cost?

   (iv) What will be the total cost of these calendars?

(b) Anne wants to order 10 deluxe desk calendars.
   What will be the total cost of these calendars, including first class postage?

(c) Ted wants to order 19 of these desk calendars as Christmas presents.
   His friend Jake tells him that it would be cheaper to order 20.

   Is his friend right?
   Explain your answer carefully.

6 MP3 player

Notes

Essential resources

calculators

Example of a lead-in question

Approximately how many megabytes there are in 5 gigabytes?

Points to note

■ Learners may want to compare the MP3 players with the music capacity of some mobile phones in part (c). For the specifications of mobile phones try searching on 'MP3 phones'.

■ This is the first task in which learners have to make a significant assumption, namely the expected 'life' of the MP3 player. Emphasise that in such situations they must state the assumption they have made and they must make it clear how their result follows from the assumption.

■ Similar capacity planning tasks involving digital cameras, back-up disc drives and similar devices could be carried out in a range of vocational contexts.

You want to buy a new MP3 player.
MP3 players come with different sizes of memory and you need to buy one with a big enough memory to store your music.

You decide to use some of the music tracks you already have to help work out the size of memory you will need.

The amount of memory used is measured in megabytes (MB).

Some of my music tracks

The Zephyr Song	*3.5 MB*	*Light My Fire*	*6.5 MB*
Voice of the Voiceless	*2.3 MB*	*All the Pretty Faces*	*4.4 MB*
Tattered and Torn	*2.6 MB*	*Lust for Life*	*4.8 MB*
Rock 'n' Roll Train	*4.0 MB*	*Ashes in the Fall*	*4.2 MB*
The Prisoner	*5.5 MB*	*Universally Speaking*	*3.9 MB*
Timebomb	*3.4 MB*	*Long Road to Ruin*	*3.4 MB*
Break on Through	*2.3 MB*	*The Call of Ktulu*	*8.2 MB*
Back in Black	*3.9 MB*		

(a) Use this information to find the average amount of memory used for one music track.

At present you have about 350 tracks stored on your computer that you want to put on to your new MP3 player.

(b) Estimate the amount of memory that is needed to store all these tracks.

The memory of an MP3 player is measured in gigabytes (GB).
1 gigabyte ≈ 1000 megabytes (≈ means approximately equal to)

Here is some information about MP3 players.

Model	NWZ-B135B	NWZ-E436FB	NWZ-S638FB	NWZ-S639FB
Price	£34.00	£68.50	£87.50	£117.00
Memory size	2 GB	4 GB	8 GB	16 GB
Battery life	Up to 16 hours music	45 hours music 8 hours video	40 hours music 10 hours video	40 hours music 10 hours video
Dimensions (mm) (L × W × H)	89.5×25×15	83.9×44×8.5	89.5×42.9×7.5	89.5×42.9×7.5
Radio	No	Yes	Yes	Yes
Weight	29 g	50 g	46 g	46 g

You might listen to the radio on the MP3 player, but you don't think you
will use it for video.

You want to buy a player with enough memory to store the tracks you already have.
You estimate that every week you download about 4 new tracks that you will
also want to add to your MP3 player.

(c) Which MP3 player do you think would be best for your needs?
    You need to consider what storage you need now and what you will need
    for tracks you add in the future.
    Explain how you reach your decision.

7 Buying a camera

Notes

Essential resources

calculators

Examples of lead-in questions

In 2010 which day of the week is 21 June?

Which day of the week is 25 December?

How many months have 30 days?

How many weeks are there between 1 March and the end of May?

Points to note

■ Learners may be unsure which of the cameras could be considered 'light'. You could do some work on holding and then weighing objects to give them a sense of this. You could also point out that a standard tub of margarine weighs 250 g, just a little more than the heaviest camera.

■ Both jobs would earn enough money to buy a camera and each job has advantages over the other, so it is important that learners give a clear reason for their choice.

■ Camera prices and specifications are changing all the time, so it makes sense to do this task with up-to-date data. Try searching on 'digital camera price specification'.

■ This style of task – choosing a product according to a set of preferred features – can easily be used in other vocational areas.

7 Buying a camera

2010

	JANUARY					
M	T	W	T	F	S	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

	FEBRUARY					
M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

	MARCH					
M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

	APRIL					
M	T	W	T	F	S	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

	MAY					
M	T	W	T	F	S	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

	JUNE					
M	T	W	T	F	S	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

	JULY					
M	T	W	T	F	S	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

	AUGUST					
M	T	W	T	F	S	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

	SEPTEMBER					
M	T	W	T	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

	OCTOBER					
M	T	W	T	F	S	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

	NOVEMBER					
M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

	DECEMBER					
M	T	W	T	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

At the beginning of May, your friend Eve asks you if you would like to go on holiday to Wales with her family.
The holiday will be for two weeks at the beginning of August.

(a) How many weeks is it until the start of the holiday?

You want to buy a new digital camera for this holiday.
You want to buy the same brand as your mum's camera.
You look up some models for this brand and make a table.

Model	MP	Optical zoom	Self-timer	Weight	Price
Powershot A470	7	3.4 ×	No	165 g	£49.98
Powershot E1	10	4 ×	No	160 g	£126.79
IXUS 80 IS	8	3 ×	No	125 g	£146.79
Powershot A1000	10	4 ×	Yes	155 g	£156.59
Powershot SX110	9	10 ×	Yes	245 g	£189.99
IXUS 870 IS	10	4 ×	Yes	155 g	£239.99
IXUS 980 IS	14	3.7 ×	Yes	160 g	£265.85
Powershot G10	14	5 ×	Yes	350 g	£358.00

You want

- the number of megapixels (MP) to be 9 or above
- an optical zoom of 4 × or more
- a self-timer
- the camera to be light
- to spend less than £200

(b) Which of the cameras in your table do you think would suit you the best?
Explain why you chose it.

You want to get a part-time job to earn enough money to buy the camera.
You see two jobs that would suit you.

Pizza Palace

Waiting staff required for Saturday night.
Hours 7.00 p.m. to 11.00 p.m.
£4.20 per hour

Willow Rooms Restaurant

Waiting staff required for Saturday night.
Hours 7.00 p.m. to 10.00 p.m.
£4.50 per hour

You go for interviews and are offered both jobs!
You can start either job straight away on Saturday 8 May.

(c) Which job would you take?
Explain carefully how you made your choice.

8 Gift box

Notes

Essential resources

copies on thin card of the net on sheet 2
compasses (for scoring)
rulers
scissors
glue
coloured pencils or felt pens

**Optional resources**

chocolates
squared paper

Points to note

■ Having real chocolates to hand will help learners decide on the shape and size of their boxes.

■ Squared paper is useful for designing the chocolate box nets.

■ When each learner has finished their chocolate box net and instructions, someone else can try and make the box to see if it works.

8 Gift box

Sui Kin has bought a pair of earrings as a birthday present for his girlfriend.
He makes a hexagon box to hold them.
He uses a net and instructions from a book he has.

The instructions are below.
The net is on sheet 2.

- Photocopy or scan the net on to thin card.

- Cut along all solid lines.

- Score lightly along all dotted lines.

- Fold along each dotted line so that the dotted line is on the **inside** of the fold.
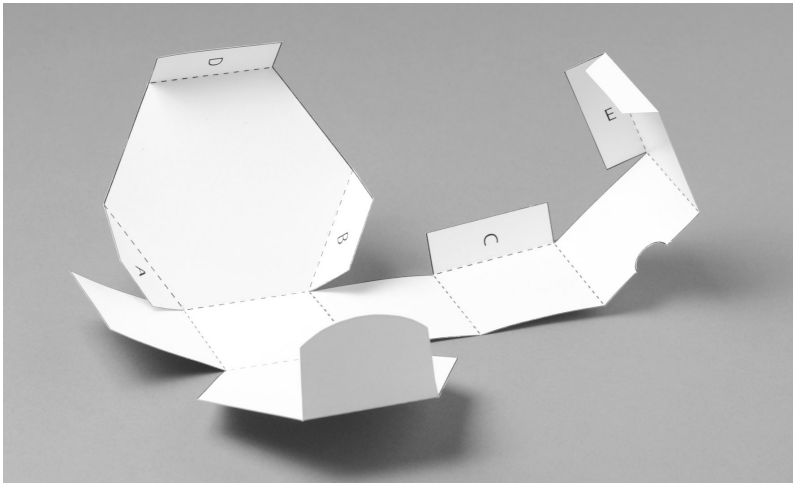
- If you want to decorate the box, do it now, on the plain side of the net.

- Put some glue on tab A, on the plain side.
  Glue it to the appropriate face.

- Repeat with tabs B, C, D, E and F.

- Close the box by tucking in the remaining tab.

(a) Use the net and the instructions to make the box.

(b) Sui Kin's mum makes some chocolates for Christmas presents.
Design a box to hold four chocolates.
Draw the net full size, including the tabs.
Write out a set of instructions to make the box.

F

E

C

B

D

A

9 Trip to Amsterdam

Notes
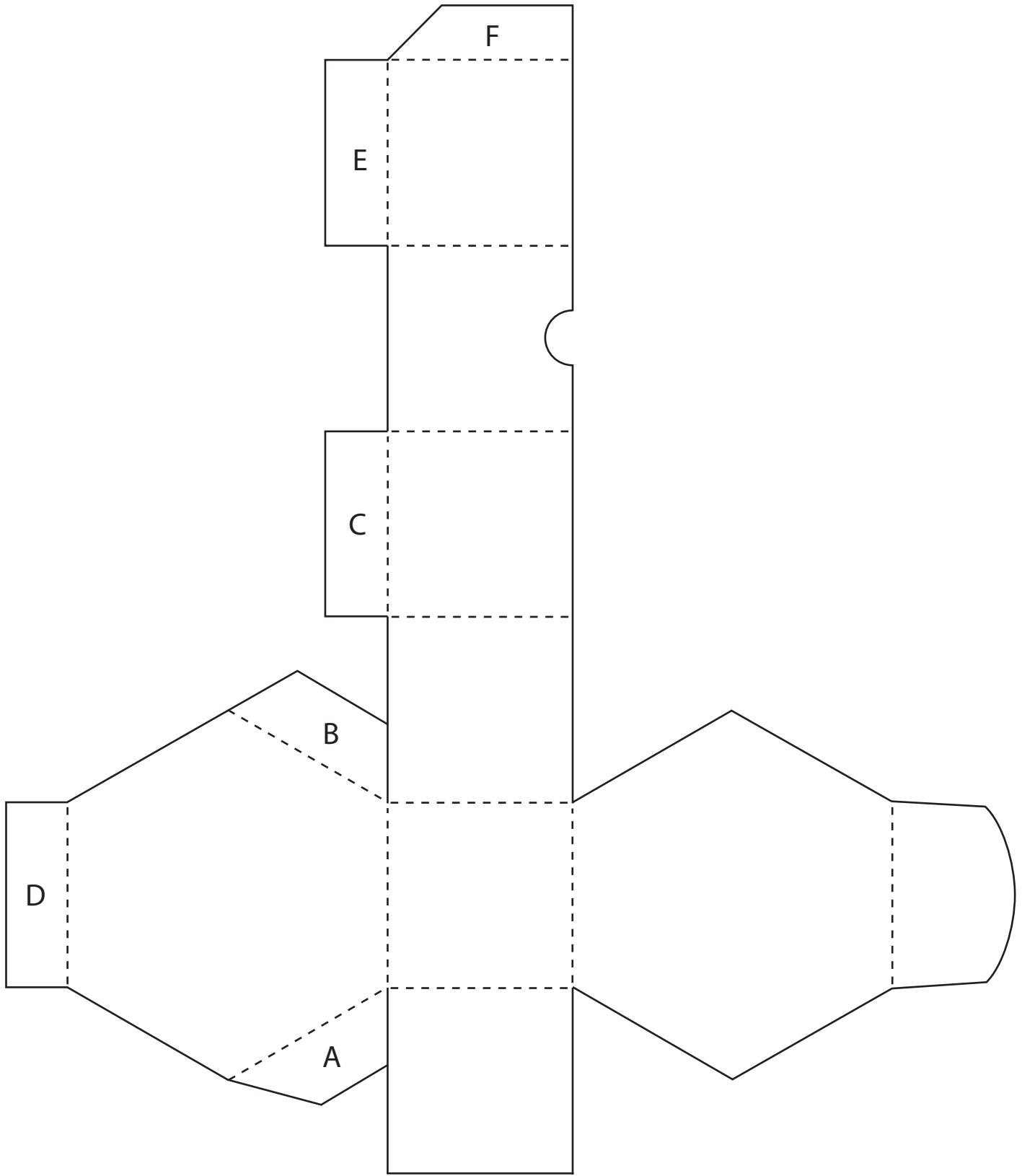
Essential resources

calculators

Examples of lead-in questions

For the itinerary shown, which station does the train leave from?
When does it leave?

How long does the train journey to Amsterdam take?

How long does it take on the way back?

How many nights will the two people be staying in Amsterdam?

Roughly, what is the equivalent cost in pounds of a drink that costs 2 euros?

Roughly, what is the equivalent cost in pounds of a meal that costs 24 euros?

Points to note

■ You may need to explain that 'single' after the fare means this is a one-way fare.

■ The journey time given is the actual duration of the journey. The times given in the itinerary are local times. Learners may not know that the time in Amsterdam is one hour ahead of the time in London, so the difference between the departure and arrival times does not give the journey time.

■ For part (d) you could discuss whether it is better to convert each cost to pounds and then add or to add all the euro costs and then convert.

■ The exchange rate has been approximated to make calculation easier. Learners may wish to find the current exchange rate between pounds and euros, but it is usually given to at least four decimal places.

■ Learners can plan their own trip to Amsterdam (try searching on 'rail to Amsterdam', 'cheap flight to Amsterdam', 'cheap hotel'). This could take the form of role-play where learner A 'phones' learner B and asks about journey details; B is online and has to respond by getting information from appropriate websites.

9 Trip to Amsterdam

You are planning a short break in Amsterdam with a friend from
Friday 23 October until Monday 26 October.

You get this information when you search for train costs and times.

London to Amsterdam: 1 Youth				Itinerary 1 of 1
Outbound – Friday 23rd October 2009				Search for another itinerary
06:59 – **London St Pancras**	13:36 – **Amsterdam Cs**	05h37m (duration)	Standard and Comfort 2 Non flexible	**£48.50** single
Inbound – Monday 26th October 2009				
16:26 – **Amsterdam Cs**	21:33 – **London St Pancras**	06h07m (duration)	Comfort 2 and Standard Non flexible	**£48.50** single

Note: youth fare is for ages 12–25.

(a) How much does the return journey to Amsterdam cost for one person?

(b) At what time do you expect to arrive in Amsterdam?

It takes you about 40 minutes to travel to London St Pancras from your home.
You must check in no later than 30 minutes before the train departs.

(c) When should you leave home? Explain your answer.

You need to decide how much money to take to spend in Amsterdam.
Here is some information from a guidebook.

Amsterdam is a small city, so it is easy to get around by walking.
The currency is the euro.

A three-course evening meal in a restaurant can cost between €18 and €30.
Lunch of a daily special and a drink can cost between €5 and €10.

A meal including a drink in a cafe or snack bar can cost between about €8 and €15.

A card giving free entry to most museums throughout your stay costs €22.45 for under 25s.

You find a hostel costing €22 per person per night including breakfast.

This rule can be used to convert approximately between euros and pounds.

amount in pounds = amount in euros ÷ 1.1

(d) How much money will you change to euros to spend in Amsterdam?
Explain clearly how you got your answer.

10 Driving lessons

Notes

Essential resources

calculators

Examples of lead-in questions

Kelly is 30 years old.
Estimate how many driving lessons she will need to pass her test.

What is the cost of 6 lessons with this driving school that are not booked in advance?
How much would you save if these 6 lessons were booked in advance?

What is the cost of the theory test for a motorcycle?

How much is it to sit the practical test in a car on a Tuesday?

Points to note

■ There is a wide range of possible answers for part (a) so learners should justify their responses carefully.

10 Driving lessons

Sharon and Neil want to pay for some driving lessons for their son Phil's 18th birthday.
A driving lesson is usually one hour long.

They want to pay for the lessons in advance.
They are not sure how many to buy.
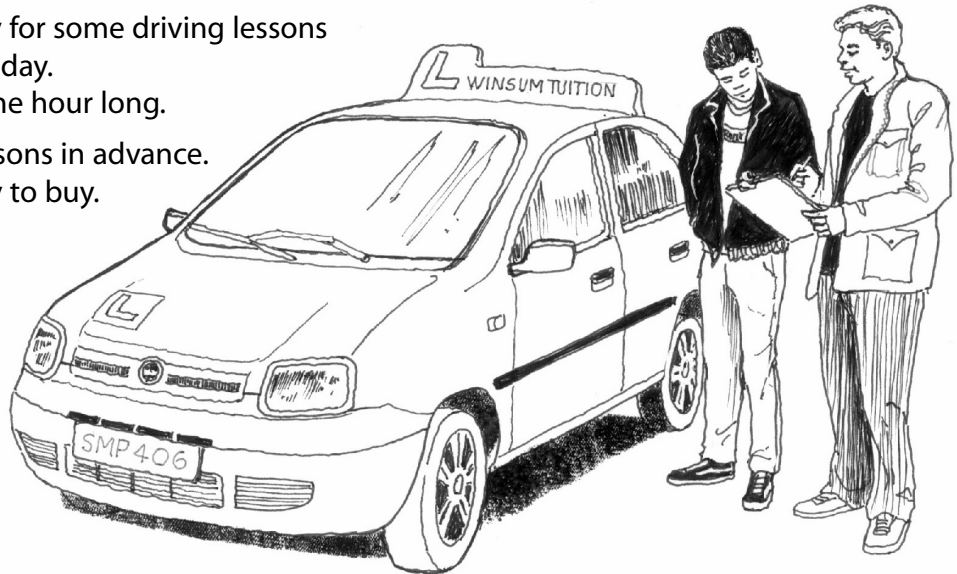
Three different driving schools give these bits of advice.

> It takes, on average, 45 lessons for a client to pass the driving test.

> Our guide for the average number of driving lessons required by someone to prepare for the practical driving test is one and a half hours per year of age. This can vary according to the individual but may serve as a rough guide.

> For our clients, the average number of driving lessons is 40.

(a) How many lessons do you think Sharon and Neil should buy for Phil? Explain how you decided.

The driving school they want to use gives the following information.

> Price per lesson (one hour): £24.00
>
> If you buy a number of lessons in advance we offer these discounts.
>
> 5–9 hours   Save £1.20 per lesson
> 10–14 hours   Save £2.40 per lesson
> 15 hours +   Save £3.60 per lesson

(b) How much would it cost for the number of lessons you decided on?

Phil is very pleased and has all the lessons his parents gave him.
He then has 4 more lessons with the same driving school and pays for them himself.

At last his instructor thinks he is ready for the test.

There are two parts to the driving test, the theory test and the practical test.
He takes the theory test and passes.
One Saturday, a few weeks later, he takes the practical test in his mum's car and passes.

He pays to take each part of the test.

Theory test	Price
Car, motorcycle	£31.00
Lorry, bus	£35.00 + £15.00 (hazard test)

Practical test	Weekday price	Weekend price
Car	£62.00	£75.00
Motorcycle Module 1	£10.00	£10.00
Motorcycle Module 2	£70.00	£82.00
Lorry, bus	£115.00	£141.00

(c) How much does Phil pay in total for his extra lessons and taking both parts
of his driving test?

11 Tokyo

Notes

Examples of lead-in questions

What is the average minimum temperature for Tokyo in July?

What is the average maximum temperature in Tokyo in October?

Which is colder, the average minimum temperature for Tokyo in December or January?

About how many hours of sunshine does Tokyo get each day in August?

About how many hours of sunshine does Tokyo get each day in December?

About how many wet days does Tokyo get in February?

Will you feel uncomfortable in a temperature of 26 °C if the humidity is high?

Will you feel uncomfortable in a temperature of 20 °C if the humidity is high?

Points to note

■ Learners may be unfamiliar with which minimum and maximum temperatures would indicate pleasant conditions for sightseeing. They could look up average conditions in the UK on the web to give them a feel for this.

■ For part (b) you could discuss whether the total rainfall in the month or the number of wet days should be considered.

■ Some complex information on humidity is included here to set the humidity values in the table in context and to help learners appreciate that the maximum possible humidity level at any time is 100%. Learners can then identify times when the humidity level is near this maximum and hence very high. However, the information in the last paragraph of the panel is essential for knowing which conditions in the table would make you uncomfortable.

■ The correct scientific term for humidity calculated in this way is 'relative humidity'.

■ The answer to part (c) will depend on the importance given to the various factors, so learners must give a full account of their thinking.

11 Tokyo

Tanya's grandmother Pam and her friend Dorothy are planning a trip to Japan.
They want to spend a week in Tokyo, sightseeing and visiting museums.
They are both retired and can go any time.

They ask Tanya to find out about the weather in Tokyo.

She finds this information on a website.

Average weather conditions

Tokyo, Japan

Month	Sun (hrs each day)	Temperature (°C) Min	Temperature (°C) Max	Humidity (%) a.m.	Humidity (%) p.m.	Rainfall (mm)	Number of wet days*
Jan	6	⁻2	8	73	48	48	5
Feb	6	⁻1	9	71	48	74	6
Mar	6	2	12	75	53	107	10
Apr	7	8	17	81	59	135	10
May	6	12	22	85	62	147	10
Jun	5	17	24	89	68	165	12
Jul	6	21	28	91	69	142	10
Aug	7	22	30	92	66	152	9
Sep	5	19	26	91	68	234	12
Oct	4	13	21	88	64	208	11
Nov	5	6	16	83	58	97	7
Dec	5	1	11	77	51	56	5

* over 0.25 mm of rain

(a) Which month has the fewest hours of sunshine?

(b) Which is the wettest month in Tokyo?

Tanya is not sure what humidity is.
She finds this information on a website.

What is humidity?

Humidity is the amount of water vapour held in the air.
Your breath holds hundreds of droplets of invisible water.
You can see it when you breathe on a cold piece of glass.

How is it measured?

At any time there is a maximum amount of water vapour that the air can hold.
Humidity is usually measured as a percentage of this.

So a humidity of 50% means that the air holds 50% of the maximum amount
of water vapour that it could hold at that time.

How does it affect you?

The human body likes humidity between 20% and 60%.

High humidity on its own will not make you feel uncomfortable though.
It is high humidity **combined with high temperature** that makes you feel uncomfortable:
the high humidity makes it harder for the body to cool itself down.

At temperatures of below about 24°C you are not affected by high humidity.
If the temperature is above 24°C and humidity is high you feel uncomfortable,
hot and sticky.

(c) When do you think would be the best time for Pam and Dorothy to go to Japan?
Explain how you decided.

12 Summer holidays

Notes

Optional resources

counters or small rectangles of paper

Examples of lead-in questions

What day of the week is the first day of August?

What day of the week is the last day in September?

How many days are there between 15 July and 2 August including those days?

What is the date a week after 10 September?

Points to note

■ You may need to remind learners to include themselves in their planning.

■ Check that the requirement to have at least three people working in the office has been noticed.

■ Check that 'the last two full weeks in August' has been understood (in Ken's message).

■ Some learners may be uncertain how to fill in the Weeks headings on the planning sheet.

■ During piloting, teachers were surprised that some learners took quite some time and much trial and error to complete the task. Some found it helpful to cut out small rectangles of paper to represent the holiday weeks and move them around. Counters could also be used for this.

■ As with the task 'Hair appointments', the least flexible requests (in this case Ken's and Yasmin's) are best considered first, then the others in order of increasing flexibility.

12 Summer holidays

	JULY					
M	T	W	T	F	S	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

	AUGUST					
M	T	W	T	F	S	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

	SEPTEMBER					
M	T	W	T	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

You work for a job recruitment company.
There are five of you who work full-time Monday to Friday in your office.

You have to sort out the summer holiday leave.
The office needs a minimum of three people to run it through the summer.

- You are happy with any two weeks between the middle of August and the middle of September for your holiday.

- You ask Pete, Ken, Sue and Yasmin to give you their requests.

> *I would like any two weeks in August as my three children are on holiday then.*
>
> *Thanks.*
>
> *Pete*

> *I'd like the last two full weeks in August. My wife is a school secretary and can't be off in term time. Sorry.*
>
> *Ken*

> *I am quite flexible and would like any two weeks between mid-July and mid-August.*
>
> *Sue*

> *My sister has booked a holiday from Saturday 31 July to Saturday 21 August and asked me if I would like to go with her. I would really like to do this as I have enough leave left this year.*
>
> *Hope I can.*
>
> *Yasmin*

Work out holiday dates that suit each person.
Remember to include yourself!

You can use the holiday planning sheet (sheet 2) to help you.

Make a notice for the office wall that shows when people are on holiday in the summer.

Holiday planning sheet

Weeks →

Staff →

13 Shortbread

Notes

Essential resources

calculators

Examples of lead-in questions

How many wedges are there in one tin of shortbread?

How many wedges are there in three tins of shortbread?

How much butter do you need to make one tin of shortbread?

How much caster sugar do you need to make two tins of shortbread?

How many tins of shortbread could you make with 500 g of rice flour and enough of all the other ingredients?

How much does it cost for a 500 g bag of rice flour?

How much would it cost for two 1.5 kg bags of plain flour?

How much would it cost for four 250 g packs of butter?

How many of these packs of butter could you buy with £5.00?
What would be the total weight of this butter?

Points to note

■ Throughout the task, learners need to distinguish between the number of tins baked, the number of wedges of shortbread this gives and the number of bags of shortbread that can be made up.

13 Shortbread

Jenny loves baking.
This is her shortbread recipe.

Shortbread

Makes 12 wedges in one tin

Ingredients

225 g plain flour
100 g rice flour
225 g butter
100 g caster sugar

Directions

1   Grease and line a 30 cm circular sandwich tin.
Sift the plain and rice flour together.
Rub in the butter and add the sugar.
Knead lightly to mix.

2   Roll out the mixture into a circle and press it evenly into the tin.

3   Bake at 180 °C (gas mark 4) for 45 minutes, until coloured.

4   Cut into wedges while still warm and leave to cool in the tin
on a wire rack; then remove from the tin.
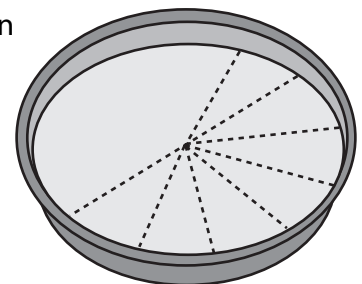
Jenny's local hospital wants to raise money to buy children's toys.
She offers to make and sell her shortbread.

She plans to make 10 tins of shortbread.

(a) Work out how much of each ingredient she needs.

Jenny goes to the supermarket to buy all the ingredients for the shortbread.
This table shows information about weight and cost.

	Weight	Cost
Plain flour	1.5 kg bag	£1.19
Rice flour	500 g bag	£1.29
Butter	250 g pack	£1.25
Caster sugar	1 kg bag	£1.00

(b) (i) Make a list of what Jenny needs to buy.

    (ii) How much will all the ingredients cost?

(c) Jenny makes her shortbread and packs it in bags with four wedges in each bag.
She charges £1.50 per bag and sells all the shortbread.

She keeps enough money to cover what she spent in the supermarket and
gives the rest to the hospital to buy toys.
How much money does she give the hospital?

14 Travel to work

Notes

Essential resources

calculators

Examples of lead-in questions

If you catch the number 50 bus at Highgate Road at 08:27, when do you get to Moor Street Interchange?

If you catch the number 35 at Pool Farm at 07:30, how long does it take you to get to Pershore Street?

How many days each week does Max work?

How many weekdays are there in a year?

Points to note

■ In part (c) learners need to find the number of days Max works in a year. They may need to be reminded that he only works 5 days a week, so they cannot just subtract the number of days' holiday from 365.

■ Learners may want to use local travel information for similar work (try searching on the name of the locality, followed by 'bus timetable' or 'bus fares'). Local knowledge about bus reliability could be added to the decision-making process.

■ Journey planning tasks can be set in many vocational contexts.

14 Travel to work

Max has just started a new job.
He works Mondays to Fridays.

He decides to try travelling to and from work by bus.
Max starts work at 9:00 a.m., but he likes to be about ten minutes early.

It takes him 5 minutes to walk from home to the bus stop at Kings Heath Church.
From this stop, he can get either the 50 or the 35 bus to work.

If Max catches the 50 bus, he gets off at Moor Street Interchange and takes
about 10 minutes to walk to the office where he works.
If he catches the 35 bus, he gets off at Corporation Street and takes
about 5 minutes to walk to the office.

Timetable for route 50

Alcester Lanes End	0745	0749	0753	0757	0803	0808	0812	0816	0824	0828
Kings Heath Church	0750	0754	0758	0802	0808	0813	0817	0821	0829	0833
Moseley Village	0757	0801	0805	0809	0815	0820	0824	0828	0835	0840
Highgate Road	0804	0808	0812	0816	0822	0827	0831	0835	0842	0847
Alcester Street	0812	0816	0820	0824	0830	0835	0839	0843	0848	0855
Moor Street Interchange	0818	0822	0826	0830	0836	0841	0845	0849	0853	0901

Timetable for route 35

Pool Farm	0730	0738	0746	0754	0802	0810	0818
Brandwood Park Road	0738	0746	0754	0802	0810	0818	0826
Kings Heath Church	0747	0755	0803	0811	0819	0827	0835
Moseley Village	0755	0803	0811	0819	0827	0835	0843
Balsall Heath Road	0803	0811	0819	0827	0835	0843	0851
Corporation Street	0814	0822	0830	0838	0846	0854	0902
Pershore Street	0817	0825	0833	0841	0849	0857	0905

(a) What time do you suggest that Max leaves home in the morning?
What time should he expect to arrive at the office?

For the first week, Max decides to buy his ticket on the bus each day.
This is the information about ticket prices displayed on the bus.

Cash fares		
	Adult fare	Child fare (age 5–15)
Single ticket	£1.70	£0.85
Day ticket*	£3.30	£2.20
* valid for unlimited use for 1 day on all bus routes		

(b) Which ticket should Max ask for on the bus each day?
How much will he spend altogether travelling to work for the first week?

After the first week, Max decides that he is happy using the bus.
He decides to investigate whether there are cheaper and more convenient ways
for him to pay for bus travel.

He finds this information about season tickets.

Regional travelcard	
Valid on all buses, 7 days a week	
1 week	£14.30
4 weeks	£48.50
52 weeks	£486.00
(payable by monthly direct debit)	

Max has 20 days' holiday from work each year plus 8 extra days off on bank holidays.
He usually takes two weeks' holiday in the summer and spreads the rest of the
holiday through the year.

Max thinks that the cheapest way is to buy a 52-week regional travelcard.

(c) How much money does Max save by buying this travelcard rather than
paying for a day ticket on the bus every day?
Show how you get your answer.

15 Gridchase

Notes

Essential resources

counters (one for each player)
six-sided dice (one between two)

Points to note

■ This is a simple game that is fun to play. It is quick so a class tournament would not take long.

■ You may need to emphasise that moving in all directions, including down and to the left, is permitted but that passing over your opponent's counter and moving along a link twice during your turn are not. The rules do not prohibit passing through the same empty circle twice within a move.

■ After a while most players start to play tactically, becoming aware of the outcomes on the dice that would allow them to catch, or be caught by, their opponent. So thinking about the probabilities of these outcomes arises naturally.

■ Be on the lookout for those who believe that, say, throwing a six is more likely or less likely than any of the other numbers, and be prepared for some discussion on this. You may also encounter other misconceptions such as thinking that the probability of a five is $\frac{1}{5}$.

■ Many learners will give responses such as 'not very likely', '50/50' and '2 out of 6' to parts (h), (i) and (j). You could encourage them to express the likelihoods as fractional probabilities.

■ Learners who are interested in designing games could try adapting the rules or the grid (for example, having a grid of equilateral triangles or regular hexagons) and seeing whether this improves the game.

15 Gridchase
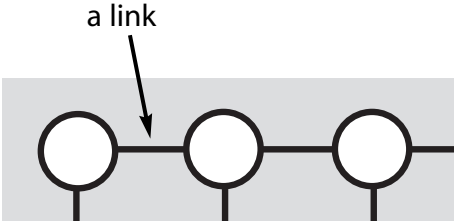
Playing the game

- Gridchase is a game for two players.
- You need a counter each and a six-sided dice.
- The game board is on sheet 2.
- Put both counters on Start.
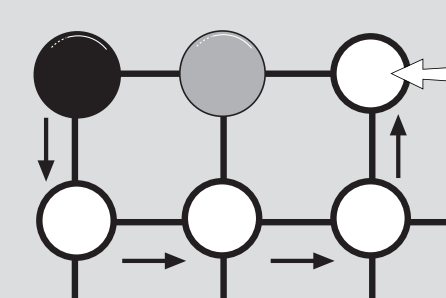
a link

On your turn

- Roll the dice once.
  Your counter has that number of 'slides', going
  from one circle to another along a link.

- You can go in any direction you like for each slide (up ↑, down ↓, right → or left ←)
  but you must not slide along the same link more than once in the same turn.
- If you slide on to your opponent's counter at the end of your turn
  you catch them and send them back to Start.
- You must not slide on to a circle occupied by the other player unless
  it is to catch them at the end of your turn.

For example, Black cannot get to this circle
in 2 slides as Grey is in the way.
Black could get here in 4 slides as shown.

The winner of the game is the first to roll an exact number to land on Finish.

(a) Play Gridchase several times, taking turns to be the first to roll the dice.

Gridchase board

FINISH

START
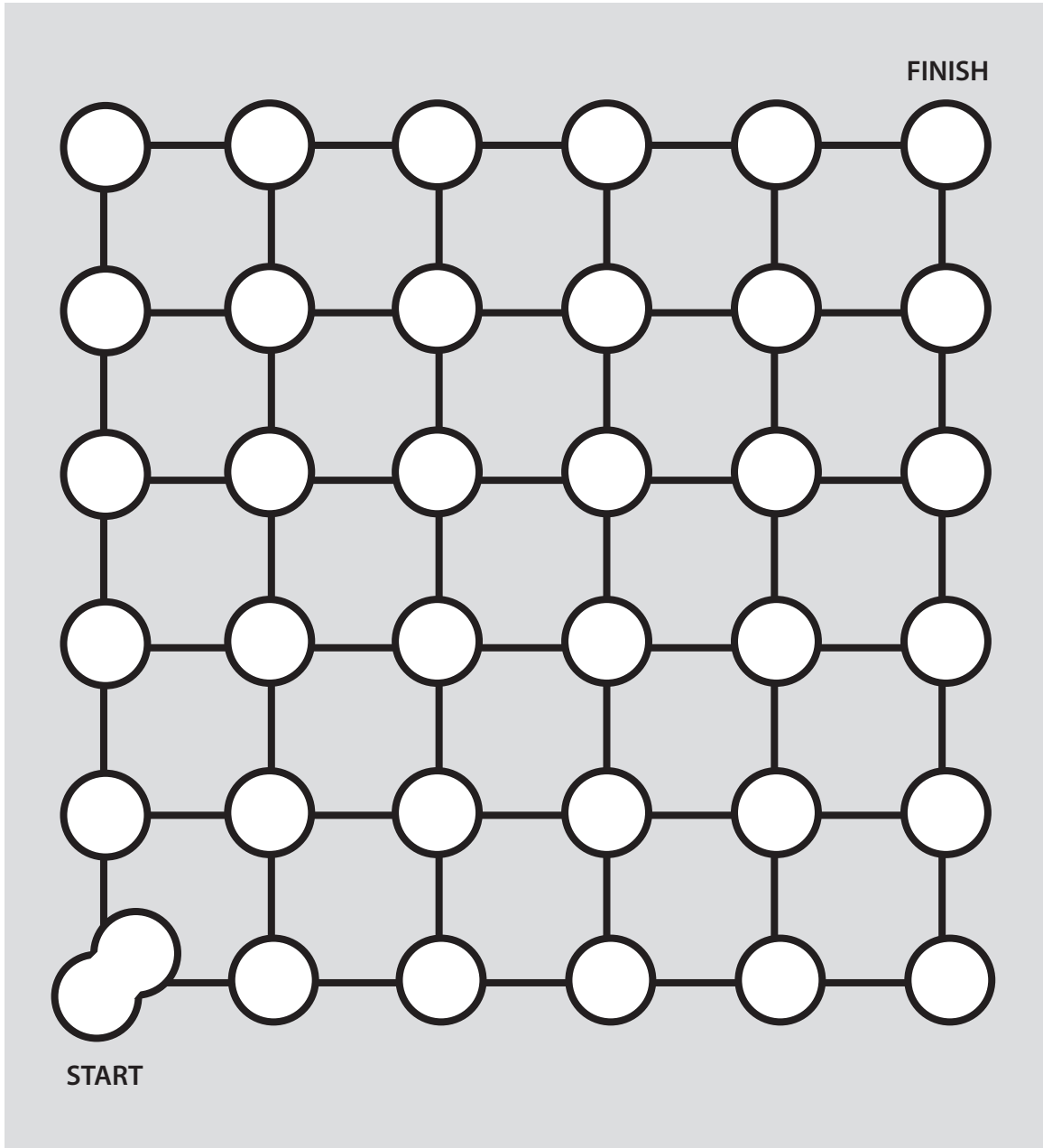
Two girls are playing Gridchase, one with a black counter and one with a grey counter.

(b) Black rolls a 5.
Can she catch Grey?
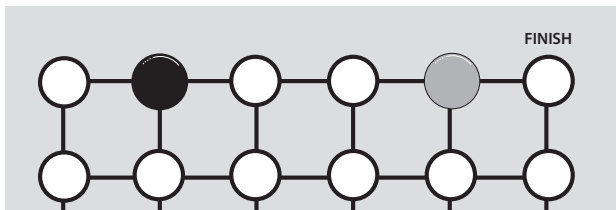
(c) Grey rolls a 4.
Can she win?
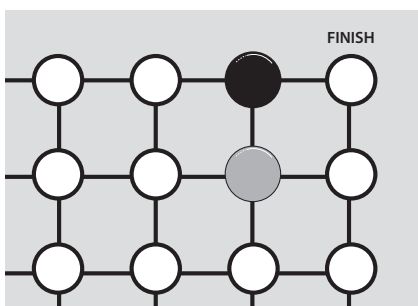
(d) (i) Black rolls a 6.
Can she catch Grey?

    (ii) Write down **all** the scores that will
let Black catch Grey here.
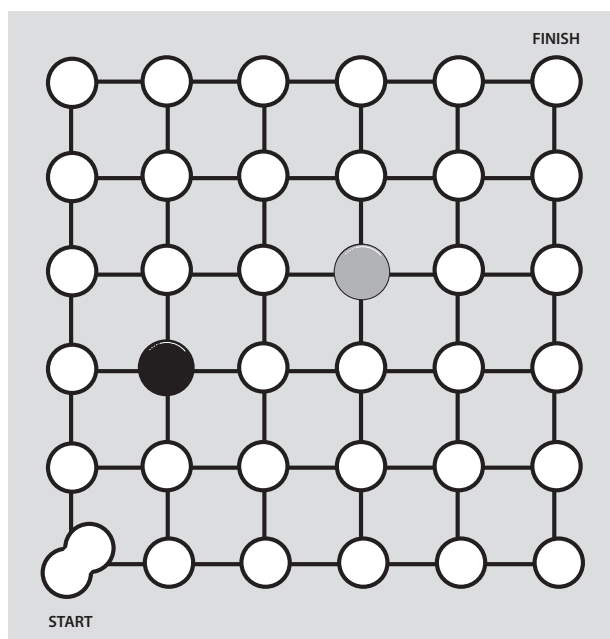
(e) It is Grey's turn.
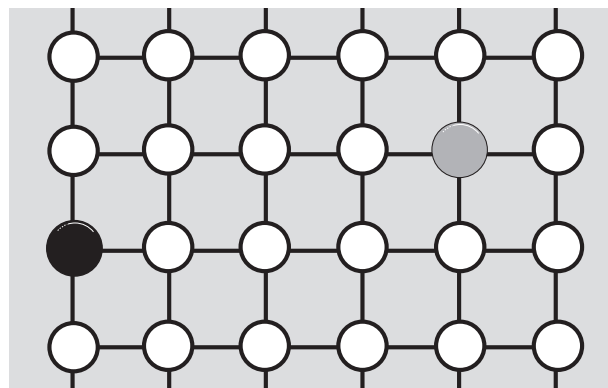She wants to catch Black.
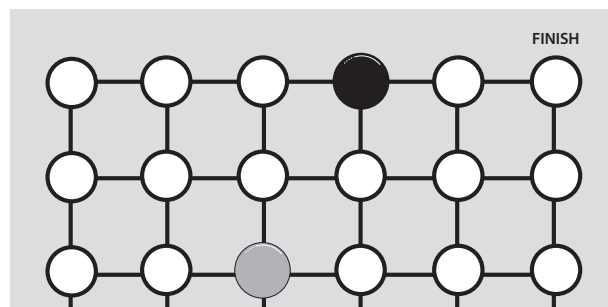Which scores will let her do this?
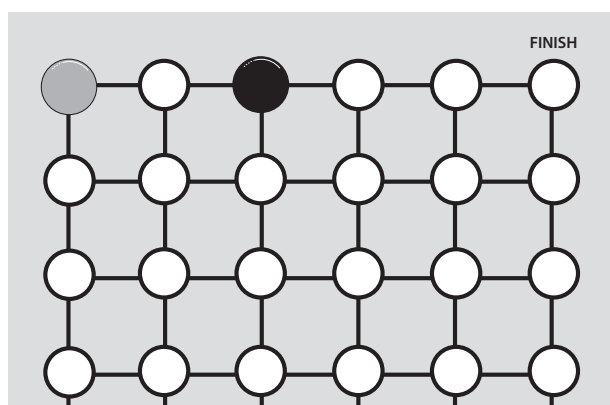
(f) It is Black's turn.
Which scores will let her win?
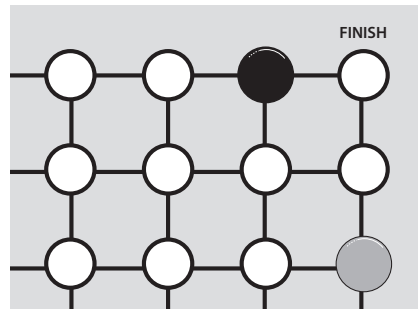
(g) It is Grey's turn.
Which scores will let her win?
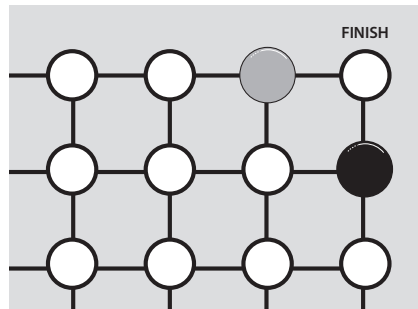
(h) It is Black's turn.
How likely is it that she
will be able to catch Grey?

(i) It is Black's turn.
How likely is she to win?

(j) It is Grey's turn.
How likely is it that she
will be able to catch Black?

16 Sanday

Notes
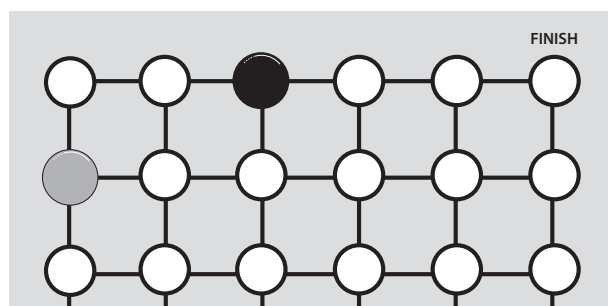
Examples of lead-in questions

A ferry leaves Kirkwall at 09:00 on a Sunday morning.
When does it arrive at Eday?

Graham wants to sail on the 08:00 ferry from Sanday on Monday morning.
He will go as a foot passenger.
When does he have to check in at the ferry terminal at Sanday?

Inga lives on Eday and wants to travel to Kirkwall on a Tuesday.
What time does the ferry leave?

Bronwen is booked on the 07:40 ferry from Kirkwall on Tuesday morning.
She is taking her car.
When does she have to check in at the ferry terminal at Kirkwall?

Ken catches the 10:10 ferry on Friday from Kirkwall to Sanday.
How long does it take to sail to Sanday?

If you catch the 12:05 from Sanday on Friday, what time do you get to Kirkwall?

Billy lives on Sanday and has a dental appointment in Kirkwall on Thursday at 12:00.
What time does the ferry back to Sanday leave Kirkwall?
When does it arrive in Sanday?

Points to note

■ This timetable has an unusual structure, consisting of separate there-and-back timetables for morning, midday and evening. It is nevertheless straightforward to use.

■ You may need to explain that ↓ means a ferry continues onwards without stopping at the island concerned.

Orkney is a group of Scottish islands just off the north coast of Scotland.

Ferries sail between Mainland, the largest island, and the smaller islands.
Most of the ferries sail from the harbour in Kirkwall, the main town of Orkney, on Mainland.
The harbour is only a few minutes walk from the Kirkwall town centre.

Some ferry routes between Kirkwall, Sanday and Eday are shown on the map.

Ferry Links

Sanday

Effective from 3 May until 28 September 2009
The services to Sanday are carried out by the vessels
m.v. Earl Thorfinn, **m.v. Earl Sigurd** and **m.v. Varagen**.

		Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Kirkwall	dep.	0900		0740		0740		0740
Sanday	arr.	↓		0905		0905		0905
Sanday	dep.	↓	0800	0915	0730	0915		0915
Eday	arr.	1015	↓	0935	↓	↓		↓
Eday	dep.	1025	↓	0945	↓	↓		↓
Sanday	arr.	1045	↓	↓	↓	↓		↓
Kirkwall	arr.		0925	1100	0855	1040		1040
Kirkwall	dep.		1035		1010		1010	
Eday	arr.		↓		1125		1125	
Eday	dep.		↓		1135		1135	
Sanday	arr.		1200		1155		1155	
Sanday	dep.	1720	1210		1205		1205	
Eday	arr.	1740	1230		↓		↓	
Eday	dep.	1750	1240		↓		↓	
Kirkwall	arr.	1905	1355		1330		1330	
Kirkwall	dep.	1915	1640	1700	1640	1500	1640	1640
Eday	arr.	2030	↓	1815	↓	↓	↓	↓
Eday	dep.	2035	↓	1825	↓	↓	↓	↓
Sanday	arr.	2055	1805	1845	1805	1625	1805	1805
Sanday	dep.		1815		1815	1635	1815	1815
Kirkwall	arr.		1940		1940	1800	1940	1940

Notes

1 Vehicle check in times: **20 minutes** before departure. Passenger check in times: **10 minutes** before departure.

2 **No show charges** All cancellations must be made not less than **24 hours** before the intended date of travel or full charges apply.

3 In order to accommodate certain local events these timetables will be subject to change.

4 For conditions of carriage of passengers and cargo see notices exhibited in the Company's vessels, offices and premises.

For full fares please enquire at Orkney Ferries offices.

(a) Mairie and Billy live on Sanday.
They want to go to Kirkwall one Saturday in June to do some shopping.

    (i) When do they leave Sanday?

    (ii) When do they arrive in Kirkwall?

    (iii) About how much time do they have to spend in Kirkwall?

    (iv) When will they arrive back on Sanday?

(b) Harald runs a one-lorry haulage service based in Kirkwall.

He has to take a lorryload of wood to Sanday one Wednesday in July.
He needs to get back to Kirkwall that same day.

On Sanday, Harald estimates it will take him about $1\frac{1}{2}$ hours to deliver the wood and drive back to the ferry terminal.
Fill in the times on Harald's timesheet.

Wednesday 8 July	Time
Check in at Kirkwall by	
Ferry leaves Kirkwall	
Ferry arrives in Sanday	
Ferry leaves Sanday	
Ferry arrives in Kirkwall	

(c) Tom and Jasmine are on holiday in the Orkneys.
They are staying in a house in Stromness for a week in August.
They arrive on a Saturday afternoon and leave the following Saturday morning.

They have a car and are planning to take it to visit Sanday for the day.
They want to do some walking, bird-watching and see the lovely beaches.

It takes about 30 minutes to drive from Stromness to Kirkwall.

They can't go on Sunday or Friday but are free the rest of the time.
They are not keen on getting up too early!

    (i) What day do you think is best for them to visit Sanday?
        Explain carefully how you decided.

    (ii) When do you think they should leave their house in Stromness to drive to Kirkwall?
         Explain carefully how you decided.

17 Garden fencing

Notes

Essential resources

calculators

Examples of lead-in questions

If I build a fence with 3 fence panels, how many posts will I need?

What is the total length of a fence panel and two posts?

What is the cost of 5 fence panels?

Points to note

■ If learners have difficulty with parts (a) and (b) encourage them to draw a sketch and mark dimensions on it. You may need to emphasise that each fence panel needs to be fixed to a post at both ends.

■ The fence posts are significantly longer than the height of the fence because they have to be sunk into the ground (and in practice their tops are trimmed to the correct height after the panels are fixed in position).

■ For part (c) you may need to emphasise that the fence panels can be cut to size. Some learners may have difficulty in deciding what happens at a corner of the fence: only one post is needed, as shown in the picture on sheet 2.

■ The division to find out how many panels are needed along one side of the garden must be carried out and interpreted carefully.

■ The size of the garden is such that a piece left after cutting a fence panel for one side is too small to be used on any of the other sides. As an extension, learners could be given other sized gardens to consider, where the possibility of re-using all or part of a cut-off piece should be considered.

■ The task could be adapted to planning and costing a fence for a local venue, with the product dimensions and prices obtained from the local DIY store.

17 Garden fencing

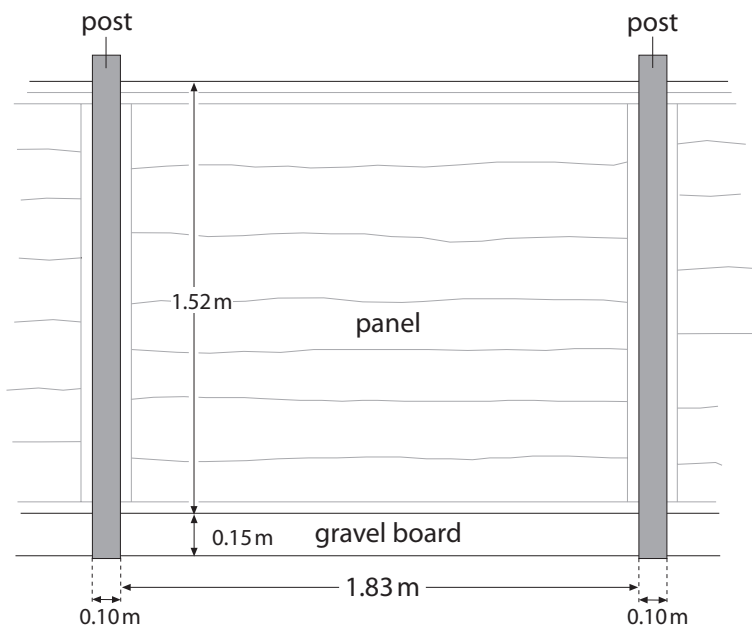You work for a company that builds fences.

Your fences use wooden fence panels, posts and gravel boards.
The posts are concreted into the ground.
The fence panels are fixed to the posts and raised off the ground by the gravel boards.
Fence panels and gravel boards can be cut to size if needed.
Each piece of fence panel must have a post at each end of it.

The sizes of the fence panels, posts and gravel boards are shown below.

	Height	Length
Fence panel	1.52 m	1.83 m
Gravel board	0.15 m	1.83 m
	Height	**Width**
Fence post	2.40 m	0.10 m

You are building a fence from four complete fence panels.

(a) How many fence posts will you need?

(b) Work out the total length of this fence.

Mr Evans has asked you to build a fence for his garden, shown in this diagram.

He wants a fence around three sides of the garden. The fence posts and panels must not go outside the boundary of the garden.
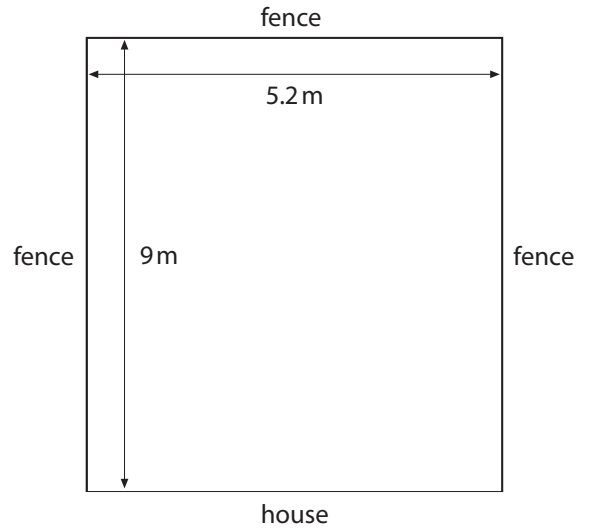
This is how the fence panels meet at a corner of the garden.
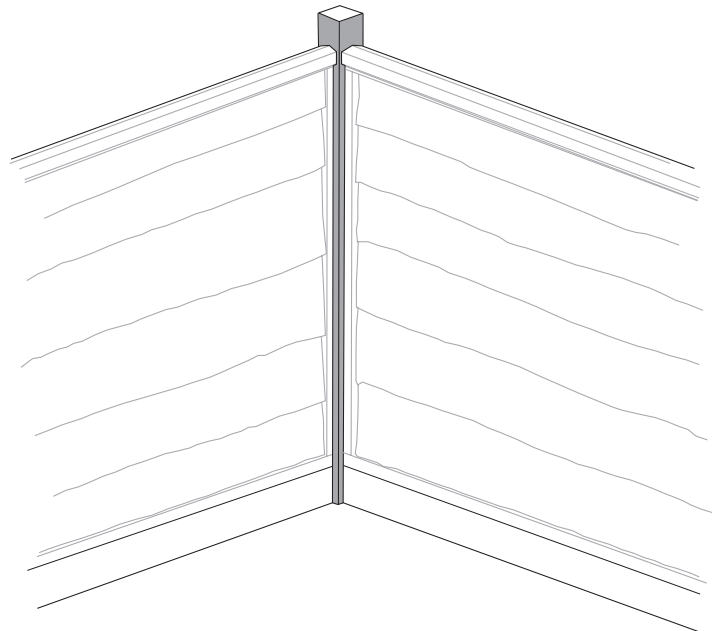
You need to plan how many fence panels, gravel boards and posts you will need to buy. You keep a good supply of concrete and nails, so don't need to buy any of these.

(c) Draw a sketch of the garden showing the position of each fence panel and post. The sketch need not be to scale. Make a list showing what you will need to buy for the fence.

Here is the price list from the builder's merchants.

Item	Size	Price
Fence panel	1.52 m by 1.83 m	£13.98
Fence post	2.40 m by 0.10 m	£6.99
Gravel board	0.15 m by 1.83 m	£1.99

(d) Find the total cost of the materials that you need to buy.

18 Coffee break

Notes

Essential resources

calculators

Optional resources

weighing scales
a jar of instant coffee
a teaspoon
a 454 g packet of coffee
a bag of sugar

Examples of lead-in questions

A box of fruit tea bags costs 98p for 20 tea bags.
How much does one tea bag cost?
Gita drinks two cups of fruit tea every day.
How long will one box of tea bags last her?

Points to note

■ This is complex problem and it can help learners to do some practical work first. For example, show them a bag of sugar and a teaspoon and ask them to estimate how many spoonfuls of sugar there are in the bag. Follow this up by asking them how they could check their estimates and then do so by weighing one or more spoonfuls of sugar and making appropriate calculations.

■ Similar work can be done with the jar of coffee. In addition, learners could estimate how long the jar would last for someone who drank three cups of coffee a day and how much that person would be spending each day on coffee.

■ Some learners will be confused about when to multiply and when to divide. It may help to try with simpler numbers first (for example, 500 g in a bag of coffee, 10 g of coffee per mug) to get a feel for the process. Also they should check their answers are a plausible size.

■ Some discussion may be needed about whether to round decimal answers up or round down in these contexts.

■ The task and lead-in questions could be adapted to other things that are regularly consumed.

18 Coffee break

Max loves fresh coffee.
He drinks two mugs of coffee each day.

His favourite is Colombian.
He uses one-cup coffee filters, which are convenient.
You just pour in boiling water and wait for it to drip
through the coffee filter.
Then you throw the filter away.

A pack of 10 of his favourite filters costs £2.70.

(a) How much does it cost him each day for his coffee?

He decides he is spending too much money on his coffee.
Also, he is not happy about throwing away a lot of waste.

He buys a one-cup filter that can be used over and over again.
He has to wash it after using it but that does not take long.

He buys a bag of coffee to use with this reusable filter.
The bag contains 454g of coffee.
It costs £4.69.

He puts two scoopfuls of this coffee in the filter to make
one mug of coffee.
The two scoopfuls of coffee weigh about 14g together.

(b) (i) How many mugs of coffee can he make with this bag?

    (ii) How many bags of this coffee would Max need to buy to last him a year?

The reusable filter costs £12.95.

(c) How much money will he save in a year if he uses this reusable filter instead
of the throw-away ones?
Include the cost of the reusable filter in your calculations.

19 Cushion

Notes

Essential resources

calculators

Examples of lead-in questions

How many small squares of fabric A will Jane need?

What is 6 mm written in centimetres?

If the small squares had been 7 cm by 7 cm in the design, what size would you cut each small square?

Which fabric will Jane use for the back piece?

Points to note

■ This is quite a lengthy task at this level.

■ Learners can check whether local or on-line fabric stores supply lengths to any number of whole centimetres or in increments of 5 or 10 centimetres.

19 Cushion

Jane wants to make a patchwork cushion cover for her mum's birthday.
Here is her design.

border pieces

fabric A
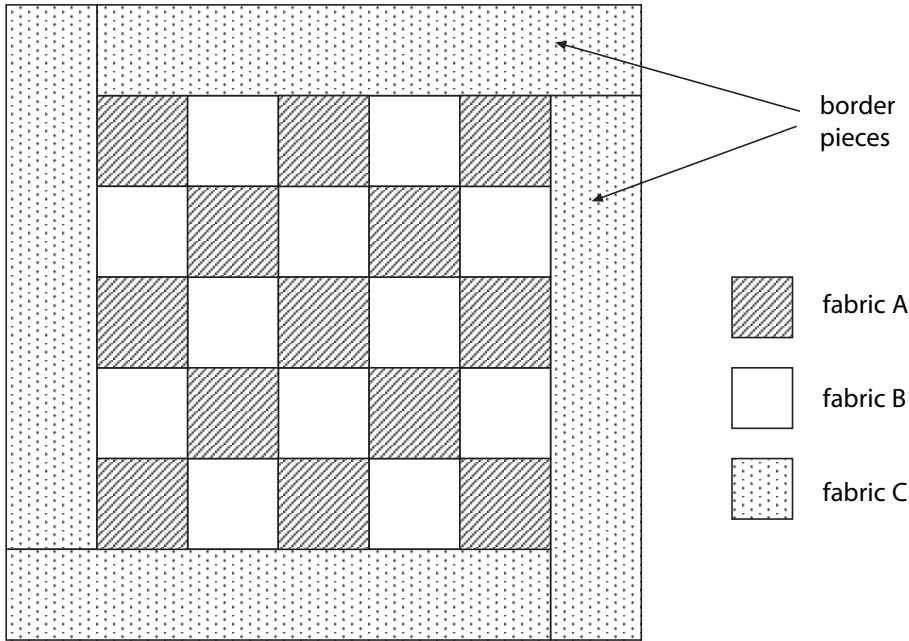
fabric B

fabric C

Jane wants the cushion cover to fit a cushion that is about 60 cm × 60 cm in size.

She wants the border pieces to be the same width as each square.

She wants the back of the cover to be a single piece of the same fabric as the middle square.

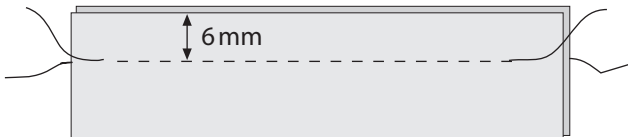She decides to make the squares in the cushion cover 9 cm by 9 cm in size.

9 cm

9 cm
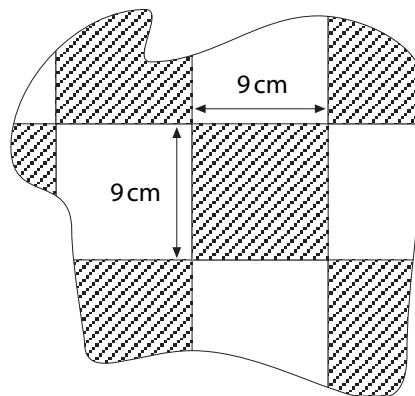
(a) What will be the length and width of each border piece?

(b) What will be the size of the whole cushion cover?
Will this fit Jane's cushion?
Show your working clearly.
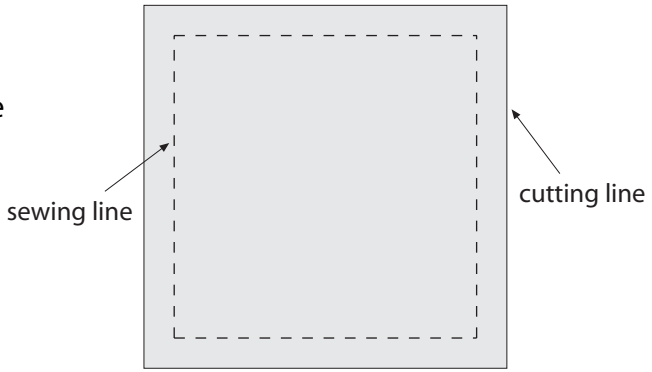
Two patchwork pieces are joined by sewing a seam 6 mm from the edges.

6 mm

For example, this patchwork piece is in the shape of a square.

The dotted line shows the sewing line and outlines the actual size of the shape on the patchwork.

sewing line

cutting line

(c) (i) What size of square will Jane need to cut for her patchwork squares? Explain carefully how you decided.

(ii) What will be the length and width of each border piece that she needs to cut?

(iii) What size of piece will she need to cut for the back?

All the fabrics that Jane wants to use are sold in rolls that are 112 cm wide.
They are sold as a length.
The minimum length you can buy is 20 cm.

112 cm
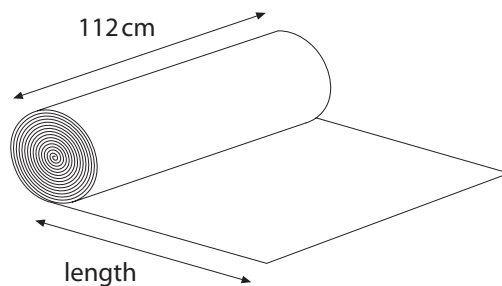
length

(d) Work out what length of each fabric Jane needs for her cushion cover. Show carefully how you worked it out.

20 Saving energy

Notes

Essential resources

calculators

Examples of lead-in questions

How many units of electricity are used by a computer with a 250 watt power rating that is kept in use for 8 hours?

How many units are used by a 100 watt light bulb that is on for 4 hours?

Points to note

■ Learners may be surprised at how little money is saved. The standby power rating used here is for a plasma TV. Older cathode ray tube TVs have a higher standby power rating.

■ An extension to this task could be to estimate how many units of electricity would be saved in a day if every household in the UK turned their TVs off rather than leaving them on standby.

■ There are a number of common errors to watch for here. The cost of a unit is a decimal but the unit is pence, not pounds as many learners may expect when dealing with decimal prices. Appropriate rounding is required. Having to deal with a decimal fraction of a unit may cause insecurity. The answers are so surprisingly small that learners may doubt that they are still working in pence.

■ Learners may want to investigate the energy used by other household appliances. Information about power ratings can be found on the appliance itself, in the instruction manual or on the web (try searching on 'appliance power rating'). There is a complication that appliances with thermostats (fridges, irons) are only operating at their stated power rating part of the time.

20 Saving energy

A magazine article says you can save money by turning your television off rather than leaving it on standby.

You decide to investigate how much money you could save.

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10 ways to cut electricity costs!

1 Use energy-saving lightbulbs
2 Don't overfill your kettle
3 Don't leave your TV on standby

Electricity companies charge for the number of units of electricity a customer uses. The number of units used by an appliance depends on its power, measured in watts, and the time it is used for.

This formula can be used to work out how many units are used.

$$\text{number of units} = \frac{\text{power in watts} \times \text{hours used}}{1000}$$

When your TV is on, its average power requirement is 189 watts.

(a) How many units of electricity does your TV use if you watch it for 2 hours?

Your electricity company charges approximately 10.1 pence per unit.

(b) How much does the electricity cost you if you watch TV for 2 hours?

On most days, you watch TV for half an hour in the morning while you have breakfast and then for about 2 hours at night.
At other times of the day or night you leave the TV on standby.

You find out that your TV requires 0.7 watts when it is on standby.

(c) About how much money will you save in a year if you turn it off rather than leave it on standby?
Show how you get your answer.

21 Artificial grass   Notes

Essential resources

calculators

Examples of lead-in questions

How much would two metres cut from a roll of artificial grass cost?

What length cut from the roll of grass would you need to buy to cover a rectangle measuring 8 metres by 6 metres?

How many square metres of geotextile fabric would you need to buy for this space?

How much would 8 square metres of geotextile fabric cost?

How much would 5 metres of jointing tape cost?

How much would 5 tubes of glue cost?

How many tubes of glue would you need to buy for a join that is 7 metres long?

Points to note

■ Artificial grass is expensive but may appeal to some homeowners with a garden and it is invaluable for all-weather sport.

■ You may need to discuss what is meant by the pile of artificial grass.

■ Note that there are different methods of costing here: the grass is per linear metre (and you have to pay for any unavoidable waste), the geotextile layer is per square metre cut to size (so you appear not to pay for waste), the tape is sold by the exact length required and the glue is per whole tube.

21 Artificial grass

Hayley has two small children and a dog.

The lawn at the back of her house gets very muddy and has lots of bare patches.
So she decides to find out the cost of replacing it with artificial grass.
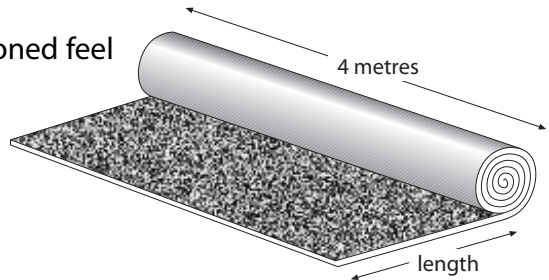
Here is a plan of her lawn.

7.5 m

4.5 m
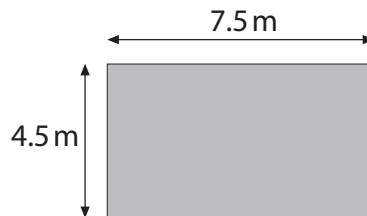
She thinks this artificial grass will be suitable.

Soft grass

A deeper (12 mm) curled pile giving a soft cushioned feel
Available in 4 metre roll widths

Price (inc VAT): £59.80 per metre cut from roll

4 metres

length

(a) How much would a 6 metre length of this grass cost?

You run a handyman business.
Hayley asks you for your advice on what to buy and how much the materials will cost.

You will need to follow this guidance.

Positioning artificial grass

- Remove existing grass and spread a thin layer of sand.

- Put down a geotextile layer to prevent weeds growing up.

- Roll out the artificial grass.
  Position the grass to minimise cuts, joints and wastage.
  No piece of grass should overlap with another piece.
  Make sure each piece of grass is laid with the pile in the same direction.

(b) (i) Draw a clear diagram to show how you would cover the lawn area with the artificial grass.

(ii) What length of grass from the roll will you buy?

(iii) How much will it cost?

Hayley already has some sand.
She needs to buy the geotextile fabric.

	Price (inc VAT)
Geotextile fabric cut to your size	£0.90 per m^2

(c) How much will the geotextile layer cost for Hayley's lawn?

Joining pieces of grass

- Cut the grass to shape.

- Position the grass with the edges you want to join touching one another.

- Fold back the edges and position the jointing tape so the edges of
  the grass will meet down its centre.
  Apply glue to the tape in a zigzag line.
  Use one tube of glue for every 3 metres of tape.
  Press the grass down on to the glued jointing tape and allow to dry.

Extras	Price (inc VAT)
Jointing tape cut to your length	£0.90 per metre
Glue	£6.00 per tube

Hayley needs to buy jointing tape and glue.

(d) (i) How much jointing tape does she need?

    (ii) How much will it cost?

(e) (i) How many tubes of glue does she need?

    (ii) How much will it cost?

(f) What is the total cost of everything Hayley needs to buy?
     Include the cost of the artificial grass and geotextile layer.

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