OCR
RECOGNISING ACHIEVEMENT

Support for Functional Skills Mathematics

Level 2

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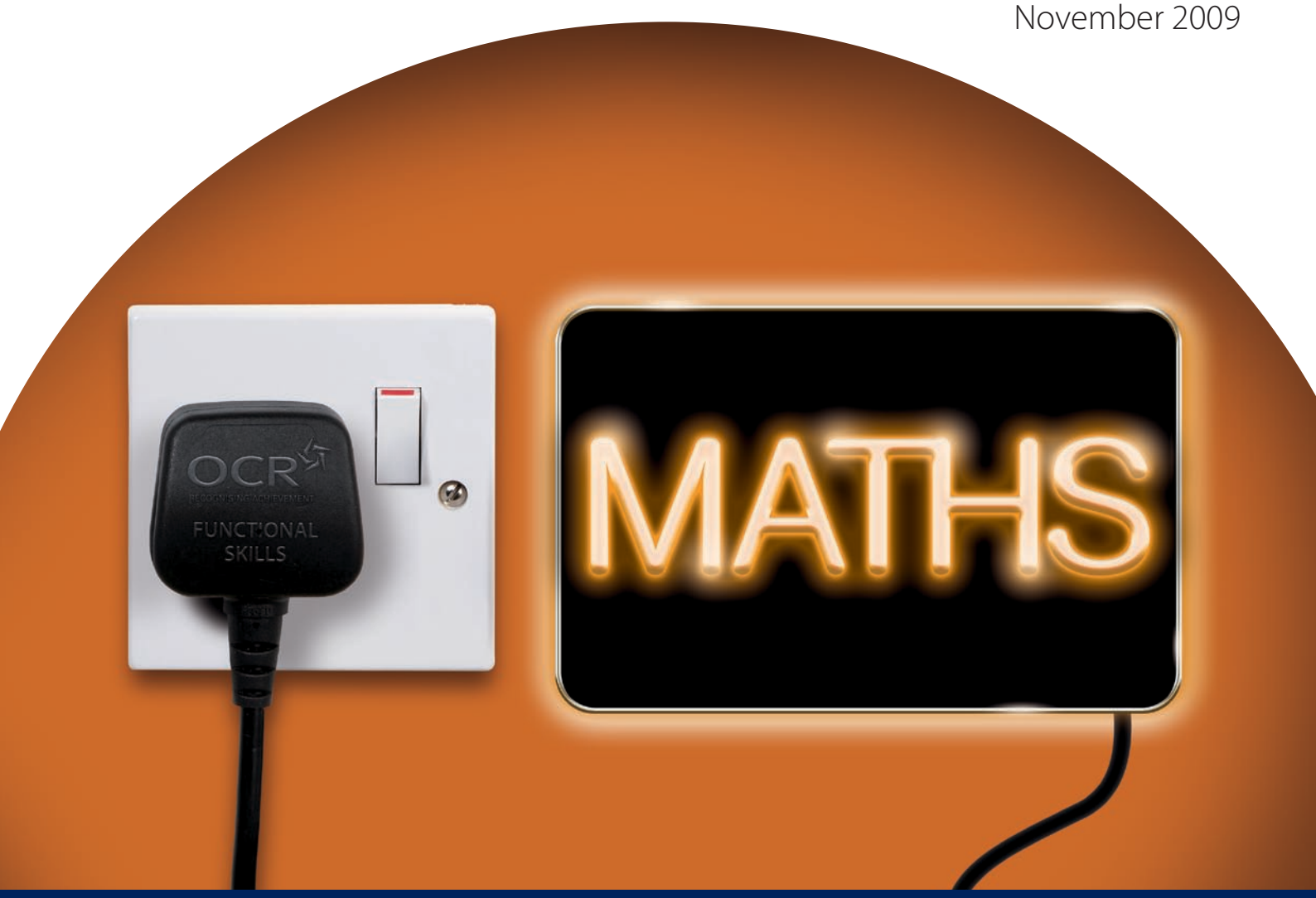

Publication developed in partnership with OCR by
The School Mathematics Project
5 St Denys Road Southampton SO17 2GN
www.smpmaths.org.uk

SMP writing and editing
Paul Scruton, Susan Shilton, Heather West

SMP design and administration
Nicky Lake, Cathy Syred, Ann White

OCR administration
Helen Beecham, Gemma Marchant

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Typesetting and technical illustrations by
The School Mathematics Project
Other illustrations by Chris Evans (pages 33 and 82), Susan Shilton (page 36), Fraser West (page 74)
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OCR
RECOGNISING ACHIEVEMENT

Support for Functional Skills Mathematics

Level 2

The School Mathematics Project

Contents

Level 2

Introduction

What these support materials aim to do

They have been written to support teaching that leads to OCR's Functional Skills Mathematics Level 2 qualification, which consists of realistic tasks needing mathematics for their solution; those tasks are presented in an unstructured way, so the goal for learners is to be able to plan what they must do to solve the problem and then carry out the necessary steps confidently and independently – in other words to use their mathematics in a functional way. Although such tasks look straightforward, the evidence from the pilot suggests that learners – including many who were considered good at mathematics – needed significant preparation in order to achieve the qualification.

A teaching resource graduated by difficulty

To meet this need we have developed 24 tasks (on pages 19–101). 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 graduated in difficulty: the first group, marked ●○○, consists of short problems that need basic interpretation and representation skills and will probably take less than a lesson; the second group, marked ●●○, contains more demanding tasks that allow steady progression towards the Level 2 standard; the final tasks, marked ●●●, match the demand of the Level 2 assessment and may present extra challenge to some learners. Our order of difficulty is only a guide: feel free to vary it 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.

What the tasks are like

Each problem to be solved is presented on a task sheet, with necessary information (of the kind that you might find in a product leaflet or website) usually provided on one or two separate data sheets. Learners must choose the information needed, process it appropriately and accurately, then present their solution clearly, stating any assumptions they have made. Discussion between you and your learners, as well as within groups of learners, is essential in developing the ability to work in this way: it is often only through discussion that those unfamiliar with this kind of work grasp what a problem is really about, confront their own misconceptions, realise when they need to make assumptions and become confident in working toward a solution.

As the task and data 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 page 5) 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

We provide two other pieces of teaching material for use in the early stages of working with the tasks – 'Making assumptions' (pages 12–14) which addresses a process that many learners find difficult and 'Reality check' (pages 15–18) which encourages them to think self-critically about misconceptions and errors, particularly those that lead to unrealistic conclusions. Each begins with teaching notes.

Level 2

Responding positively to learners' difficulties

The teachers* who piloted draft versions of the tasks were early participants in the OCR Functional Skills Mathematics Level 2 pilot. That gave them a wealth of experience in bringing functional mathematics into their own classrooms and talking with their colleagues about its introduction. These ideas for responding positively to learners' difficulties are based on their valuable insights.

Learners have trouble making sense of the information they are given.

At the start of a new task, first give out (or project) the data sheet(s) without the task sheet, 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 teaching notes that precede each task: you can adapt these questions and make up more of your own if you need to. You can progress to more complex questioning if that's appropriate but try to avoid this session turning into an explanation of how to do the task.

When they get the task sheet they look at it and don't know where to start.

Get the class working together in pairs or small groups to sort out

- what the task sheet is asking them about
- what kind of outcome their work is meant to have – a numerical value, a decision about a course of action or some other kind of result
- what steps will be needed to reach the outcome

Often it is best if they devise the plan for their work by thinking backwards from the type of outcome required: if so, explain that to them. Have each group report back to the whole class on their plan of action, then lead a discussion about any differences in what has been suggested. You can then decide whether you want them to work in groups to complete the task or to work individually.

They can't cope with the amount of reading, particularly on the data sheets.

In these tasks, as in the assessment, the literacy demand is lower than the functional mathematics demand. Often the difficulty for learners is that of reviewing a significant amount of authentic information and picking out what's needed to complete the task. So once they have a rough idea of the nature of the task, you can get them to mark on the data sheet with a highlighter pen the information they think they will need. Then as they proceed with the task they will have a better chance of getting to this information without losing the thread of their work.

The tasks have much in common with the reading and writing question paper in the Functional Skills English Level 2 assessment where learners are similarly expected to extract key ideas from a large amount of information: it may be worth looking at some of the past papers for that assessment – if possible alongside colleagues who teach functional English, with whom you may be able to share ideas.

They come to a standstill when they have to assume something.

Making assumptions is a feature of real-life problem solving and you should be ready to spend some time on it, starting quite early in your teaching programme. We supply teaching material on making assumptions, together with teaching notes, on pages 12–14.

* 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.

Learners don't like it when there can be more than one answer to a task, depending on what they have assumed.

Emphasise that they must report on the assumptions they have made, so that someone reading their solution can decide whether they agree the assumptions are reasonable. The important thing is that the solution follows correctly from the data and the assumptions. One reason for putting 'Book club' first in the sequence of tasks is that it has more than one valid solution and can therefore lead to discussion of this point.

They also have difficulties when they have to make an estimate of a measure.

In your teaching programme include practical work on measuring metric lengths and link it to estimating lengths: include estimating the length of something they can currently see as well as something they can't (for example a single-decker bus). Similarly involve learners in using weighing scales and link this to estimating metric weights: this should include estimating the weight of, say, a stone held in one hand as well as something they are not holding (such as an adult cat). It helps if you establish benchmarks, such as the 500 gram bag of sugar and the 2 metre high standard door, then relate other measures to them.

They don't want to write much down.

Explain they should be writing a brief account of their work that will be convincing to someone interested in a solution to the task set: their account must state the information they have picked out from the data sheet, any assumptions they have made and 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 and convincing response to a functional mathematics task. These elements are about effective functional communication and they correspond closely 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.

It can be used for peer checking of work.

Points in the checklist are also relevant to the functional element in the revised GCSE Mathematics specifications.

Level 2

Learner's response checklist

Your response to a Functional Skills Mathematics Level 2 task should contain most of these.

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

2 Evidence that you have done some planning

3 Any assumptions that you have to make (Say what each one is and why you need it.)

4 Evidence of logical thinking (When you take a step, give your reason.)

5 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.
- If you do something like 'finding the mean' or 'allowing for the tallest person', say so.
- Your calculations need to be correct so check whenever you can.

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

7 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 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.

8 A sound and properly stated conclusion:
- Look back at the task sheet: are you required to complete the task by giving a cost or other quantity, advising on a decision, presenting a scale drawing, planning chart or travel plan – or something else?
- If you arrive at your conclusion from a calculation, explain how.
- If your conclusion 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?

9 Possibly a statement about limitations your conclusion may have:
- Does it depend on estimates that can only be rough?
- If the data is from a small sample, could this affect the reliability of your conclusion?
- Could the data be biased because of how it was collected?

Level 2

Marking

We have not provided 'answers' to these tasks. This is because a single short answer is not what needs to be given credit: learners' working and explanations are as important – and some will use differing but valid approaches.

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.

When marking you can have the checklist on the previous page 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 elements in the checklist are closely linked to the process skills of 'representing', 'analysing' and 'interpreting', described in the Functional Skills Standards for mathematics.

'Representing' is used to mean making sense of a situation and representing it in mathematical terms, selecting the mathematical information that will need to be used; this is covered in the checklist by elements 1, 2, 3 and to some extent 4.

'Analysing' is used to mean using mathematical procedures, examining and adjusting the approach and finding results; this is covered by elements 4, 5, 6 and to some extent 7.

'Interpreting' is used to mean interpreting and communicating appropriate and accurate results from the work; this is covered by elements 7, 8 and 9.

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 (including, often, an 'answer' that doesn't consist of a quantity).

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.

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. You don't need to do all the tasks but it is important to choose a variety of types; functionally confident learners can omit the easier tasks. GCSE Mathematics now includes a functional mathematics element with a significant weighting on the mark scheme, so the benefits of becoming confident with this style of learning go further than the stand-alone functional skills assessment.

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. There's some research evidence suggesting that learners have difficulty with real life problems in mathematics not because they lack knowledge about the context but because they decline to use it, believing that it's not what you're expected to do in maths lessons. The idea that common sense doesn't belong in the mathematics classroom is prevalent and a source of many difficulties.

Piloted tasks did generally go better when learners were motivated by the context; 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.

Some of the tasks involve discussions that are more like those that would go on in personal, social and health education lessons; I'm not used to dealing with that.

A high priority is to avoid the lesson causing distress to someone who is personally affected by the matter being discussed. Some teachers have found it helpful to agree ground rules like the following with the whole class:

- People don't have to join in discussion of a PSHE context if they feel uncomfortable about the subject.
- People should feel free to put some distance between their comments and specific situations (referring to 'someone I know' rather than 'my brother').
- If someone does offer personal information it must be treated with respect by the rest of the group.

Be on the lookout for people who seem concerned about the direction the discussion is taking. Consider, too, whether experiences or prejudices of your own are limiting discussion or diverting it in some way. Remember that it isn't only in areas such as health and relationships where there can be sensitivities: it's relevant to functional mathematics that financial hardship is an embarrassment for some people.

The whole area of sensitive subjects is one that requires experience: check your school or college policy on this kind of teaching and be ready to discuss the work with your PSHE colleagues and other staff.

I find it difficult to help learners who are struggling with spatial tasks.

Work through such tasks yourself before giving them to the class so you are clear about what has to be done and ready for the difficulties that are likely to crop up. Have rulers, squared paper, dotty paper and sticky tape ready, and encourage learners to experiment with sketching, scale drawing, cutting, folding and assembling at any stage of their work (and do so yourself). The time you allow for this will be well spent. As they get older, learners are often reluctant to do this sort of thing, trying instead to do everything by calculation. Yet at this level parts of some tasks can only be completed by reasonably accurate drawing.

Mathematical skills and knowledge

Some learners trying out the tasks objected that some of them – especially planning and spatial tasks – were 'not maths', even though many presented a significant challenge. This is because problem-solving thinking skills are at the forefront in this work, with the required mathematical procedures and knowledge kept relatively elementary. (At this level the Functional Skills Standards specify content and skills equivalent to national curriculum mathematics levels 1–6, the adult numeracy standards and application of number key skill, level 2.)

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

- proportional reasoning (including, for example, finding the amount of protein in a certain quantity of an ingredient, given that there are 25.5 grams of protein per 100 grams of that ingredient)
- calculation of perimeter, area and volume
- fluent use of a calculator to deal with percentages (including, for example, 5.3%)
- conversion between metric units
- working entirely in millimetres, even for furniture-scale lengths
- time calculations
- using formulas (usually expressed in words rather than symbols)
- scale drawing.

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 discuss what it can be used for, 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 (it can be started in year 7 in secondary schools); 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.

Making assumptions

Notes

Many of the tasks in this support material require the learner to make one or more assumptions.

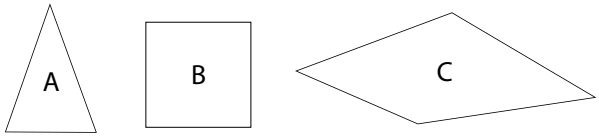
This section is intended to promote discussion of what it means to make an assumption and what is a sensible assumption in a particular case. Learners are not expected to produce written responses. One approach is for them to discuss a task first in pairs or small groups followed by whole class discussion.

Sometimes an attempt to solve a task can go wrong because an assumption has been made (perhaps unconsciously) that should not have been made.

To illustrate this, as an introduction to 'Four problems' on page 14, a teacher chose two friends and got the class to imagine they were organising a joint birthday trip to Alton Towers for them. The two friends each chose a list of seven friends they would like to invite. The class were then told that they had a minibus that seated 16 passengers and were asked whether they could invite any more people. When the lists were looked at it was found they had four people in common, illustrating that simple adding to find the total number of people invited was not appropriate in this context.

Learners take time to become comfortable with the idea that there may be more than one valid solution to a problem, depending on the assumptions they make. To illustrate this, one teacher used an 'odd one out' activity as part of her introduction. She presented her class with three items (A, B and C), said 'A is the odd one out: why?' and then followed up with the same question with B, then C as the odd one out.

For example, these three shapes could be shown.



A can be the odd one out on the assumption that it is the number of edges that matters.

B can be the odd one out as it is the only shape with right angles, or with rotation symmetry.

C can be the odd one out on the assumption that possessing reflection symmetry is what matters.

Learners can make up their own sets of shapes or numbers where each one could be the odd one out, depending on what feature is assumed to matter, and can present them to the rest of the class.

Level 2

Making assumptions **Task sheet** (1 of 2, no separate data sheet)

To solve a problem or answer a question you sometimes need to make an estimate or make a decision about something that you do not know for certain.

For example, Meera wants to buy tiles of a particular design to cover one wall in her bathroom.

She decides on the number of tiles to buy on the following basis.

- The wall is 1.77 m high by 1.68 m wide.
- Each tile is 33.0 cm high by 24.5 cm wide.
- Some tiles will get damaged when she cuts them and will have to be thrown away. 10% more tiles should be added on to allow for this.

Meera is sure about the measurements as she was very careful taking them.

It could be that she will not damage any tiles.
It could be that she will damage more than 10% of the tiles she buys.
She assumes (maybe based on her past experience) that no more than 10% of the tiles will get damaged. She is making an **assumption**.

Jane's party

Jane is deciding what food to buy for her 16th birthday party.
She has invited 40 friends.
She plans to serve chicken pieces, sandwiches, potato salad, green salad and crisps.
The puddings will be cheesecake and lemon tart.

These are the assumptions she makes.

A About $\frac{3}{4}$ of the people I have invited will turn up.

B Each person will use one paper plate.

C Each person will eat about two sandwiches.

D Each person will eat about three pieces of chicken.

E An ordinary bag of crisps will be enough for two people.

F Only about $\frac{1}{2}$ the people who come will eat pudding.

▶ Which of the assumptions do you think are sensible ones for Jane to make?

▶ How many lettuces do you think Jane should buy for the green salad?
What assumptions did you make?

Dave and Bethan's walk

Dave and Bethan are planning to go walking at the weekend.
Their walk is 16 miles long.
They estimate how long it will take them like this.

When we walk to the shops it takes us 15 minutes and that is about one mile.
So to walk 16 miles we will take 16 × 15 minutes which is about 4 hours.
So if we start the walk at 9.00 a.m. we will be back at the car around 1 p.m.

- What assumptions have Dave and Bethan made?
- Do you think they are sensible assumptions?

Four problems

Discuss each problem and solution below.

- Write down any assumptions that you think have been made.
- Say whether or not you think these assumptions are sensible.

A

Kevin and Kelly are throwing a party.
They each make a list of all the people they want to invite.
Kevin's list has 20 people on it. Kelly's list has 25 people on it.
Can you say how many people they will invite to the party in total?

20 + 25 = 45 so they invite 45 people.

B

Nisha is planning a children's birthday party.
She invites 20 boys and 25 girls.
Can you say how many party bags she should make?

20 + 25 = 45 so she should make 45 party bags.

C

A 0.5 kg bag of flour costs 42p. Can you say how much a 2 kg bag of flour will be?

4 × 0.5 kg = 2 kg
So the 2 kg bag will cost 4 × 42p = £1.68

D

0.5 m of fabric costs £4.20 . Can you say how much 2 m of the same fabric will cost?

4 × 0.5 m = 2 m
So the 2 m length will cost 4 × £4.20 = £16.80

Level 2

Reality check

Notes

Essential resources

calculators

Points to note

- These problems are to help learners develop their skills in the 'interpreting' strand of the key processes.
- When working on real-life problems many learners make errors with units and will be satisfied with plainly unrealistic answers. Some are not used to checking to see whether their answers are sensible while others do not have sufficient experience to know what a sensible answer would be. For example, in the piloting of problem F some learners were unperturbed by a weekly electricity bill of over £3,000 because they had little idea of the typical size of such bills.
- During piloting, one teacher cut up the problems and organised them in a 'carousel' for learners to try in groups.
- In problem C, the symbol '$\approx$' is used for 'is approximately equal to'; learners may not have seen this before.
- See also elements 7, 8 and 9 in the checklist on page 7.

Level 2

Reality check

Task sheet (1 of 3, no separate data sheet)

Here are some problems with unsatisfactory solutions.
Find a satisfactory solution for each problem.
Compare your solutions with someone else's.

A

Meera claims for expenses for business trips.
For travelling in her car, her allowance is 40p per mile.

She travels 268 miles on a return trip.
She spends £15.60 on lunch and dinner.

She wants to work out how much to claim.

268 × 40 = 10720
10720 + 15.60 = 10735.60

So her claim is £10735.60.

B

Each morning Suneeta eats 25 g of raisins with her porridge.
She buys a bag of raisins that weighs 1.5 kg.
She wants to know how long this bag will last if she only eats the raisins with her porridge.

1.5 × 100 = 150
150 ÷ 25 = 6

So the bag will last 6 days.

C

Seven friends are out for a meal.
They decide to share the cost of the meal equally.

The total bill is £113.42.

They want to know how much each should contribute.

113.42 ÷ 7 ≈ 16.20

So each pays £16.20.

D

Julie is planning to decorate the hem of a dress with a row of fabric flowers.
There will be no gaps between the flowers and they will not overlap.
The length round the hem of the dress is 56 cm.
Each flower has a width of 12 mm.

She wants to know how many flowers she will need.

56 ÷ 12 = 4.666 666 666 66

So she will need 5 flowers.

E

Asif lives in Oban.
He has a very important meeting in Glasgow on a Tuesday which begins at 11.00 a.m.

These are the times of the trains from Oban to Glasgow during the week.

Journey number	1	2	3
Dep. station	Oban	Oban	Oban
Arr. station	Glasgow Queen St	Glasgow Queen St	Glasgow Queen St
Departs	08:11	12:11	18:11
Arrives	11:30	15:30	21:29

He wants to know which train to catch.

Catch the 08:11 and get to the meeting late.

F

Gail rents a holiday cottage.
She pays for her electricity at the end of the week.

The meter reading at the start of the week is 2058 units.
At the end of the week the reading is 2221 units.

The electricity costs 18.87p per unit.

She wants to work out the total cost of the electricity.

The number of units used is 2221 – 2058 = 163
18.87 × 163 = 3075.81

So the cost of the electricity will be £3075.81.

G

Colin drives from Manchester to Cardiff, a distance of 195 miles.
The petrol he uses on the journey costs £22.48.

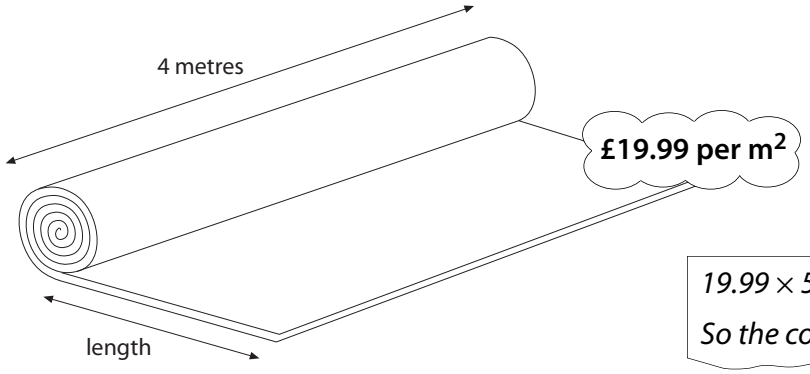
He wants to know how much he spent per mile on petrol for this journey.

195 ÷ 22.48 = 8.674 377 224 2…

So he spent £8.67 per mile.

H

Sheila buys a 5 metre length of carpet from this roll.
She wants to know how much it costs.



19.99 × 5 = 99.95

So the cost is £99.95.

I

Rita has a piece of silver ribbon that is 200 cm long.
She wants to cut it into six pieces of equal length to wrap round some candles.

200 ÷ 6 = 33.333 333 333 33…

So she needs to cut six lengths that are each 33.333 33 cm long.

J

Ruby's car travels about 8.8 miles per litre of petrol on a long motorway drive.
She is driving from Exeter to Edinburgh mainly along motorways.
The distance is 480 miles.
She wants to know roughly how many litres of petrol she will use on the journey.

480 × 8.8 = 4224

So she will use 4224 litres of petrol.

K

Fiona invests £5000 in bonds that have an annual interest rate of 3.8%.
She wants to know how much interest she will make on this investment.

5000 × 0.38 = 1900

The interest is £1900.

Level 2 ●○○

1 Book club

Notes

Examples of lead-in questions

Which days does Kelly prefer?

What does Jameela do on a Monday?

Points to note

- One way to start is to consider the problem of choosing a new evening for the book club and for learners to identify any information that they think will **not** help in solving the problem. They can then highlight the information they think is relevant in each email.
- This is a good example of a task where there is not a single right answer, but where learners need to explain their reasons for their choice of answer.

Level 2 ●○○

1 Book club

Task sheet (1 of 2, no separate data sheet)

Sue runs a book club.
There are 15 members, including Sue.

They usually meet on the first Saturday of every month and discuss a book.

People don't want to have it on a Saturday any more.

Sue sends them all this email.

From: Sue McPherson <suem@gotmail.com>
To: Book club
Date: Sunday 29 March, 2009 10:30 a.m.
Subject: New night for meeting

Hi all,

We agreed last night we would look for another night for us all to meet. Can you email me next week with your preferences and I will try and find the night that suits us best.

All the best,

Sue

Here are their replies.

Hi Sue,

I can only make Tuesdays or Wednesdays.
I have to take my son to band practice on Monday, have yoga on Thursday and I don't want to do Friday or Sunday.

Kim

Hi,

I can't do Thursdays. Otherwise OK :-)

Myrtle

Hello Sue,

I prefer Thursdays but any other night would do. Not Friday though.

Love from Vernon x

Hi Sue,

We would prefer Monday or Wednesday but we could do Tuesday or Friday too.

Luv from Kelly and Jason

Hi Sue,

I've got swimming club on a Wednesday and an art class on Thursday but I could make any other night except Friday.

Joan xxxxx

Hi Sue,

Any day is fine for me except Monday.

Aisha

Sue,

I can only do Monday but I don't come all that often as you know.

Good luck with sorting it out.

Tom

Sue,

I can only do Thursday or Friday.

Ken xxxxx

There are more replies on the next sheet.

Dear Sue,

This is really tricky. I have swimming lessons on Monday but I think I could move them if you wanted the book club on Monday.

Tuesdays are fine though I might have to miss some if I have to go to parents evenings at school.

Wednesdays are just about OK though I would have to rush my supper.

I could so some Thursdays but not all as I have to go to a computing class about every three weeks.

Fridays are OK. Sundays are not.

Hope I can still come to book club as I love it so much!

Jenny

Good morning Sue,

I'm happy with Wednesday or Thursday (though I prefer Wednesday). I could come sometimes on a Monday.

Love from Estelle

I can make Tuesday, Thursday or Friday. But I might be moving soon so just forget about me.

Yours,

Jane

Hi Sue,

My partner works nights during the week so I can only do Friday or Sunday.

All the best,

Saria

Hi Sue,

I have a Pilates class on Monday early so could make that night but it would be a rush. I could come sometimes on a Tuesday but not always as I sometimes teach a class that night at Holway College.

Wednesday is fine. I can't do Thursday as I have a watercolour class that evening. I don't want Friday or Sunday.

Love,

Jameela

Sue is happy with any day of the week but is not keen on Friday or Sunday.

Choosing a night

▶ Which day do you think Sue should choose for book club night? Show clearly how you made your decision.

▶ Write a short email that Sue could send to the group explaining briefly why this decision was made.

Level 2 ●○○

2 Business cards

Notes

Essential resources

calculators

Examples of lead-in questions

What is the cost of 200 cards without postage?

How much is the postage for 2000 cards?

Points to note

- This work is intended to give learners experience in interpreting a table, a process that is not always straightforward (see also 'Photo postcards' 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.
- Some learners fail to read the line saying that Coolprint only print the quantities shown.
- Similar work could be based on price tables in other vocational areas.

Level 2 ●○○

2 Business cards

Task sheet (1 of 1, no separate data sheet)

Coolprint is a company that prints business cards.
The prices of their cards are shown in this table.

Full colour business cards

Quantity	50	100	200	300	400	500	1000	2000
Price	£9.99	£14.99	£21.49	£24.99	£28.99	£32.99	£44.99	£69.99
UK P & P	£3.00	£4.00	£6.00	£6.00	£7.00	£7.00	£10.00	£10.00

We only print the quantities shown.

Your business cards

You order 50 business cards.

▶ What will be the cost including postage?

Dominic's business cards

Dominic is a freelance accountant.
He wants to order 250 business cards.

▶ What is the cheapest way for him to buy these from Coolprint?

Keeley's business cards

Keeley estimates that she will need about 1000 business cards to last a year.
She wants to compare the cost from Coolprint of ordering them all at once or placing two orders about six months apart for 500 cards per order.

▶ How much cheaper is it for her to order them all at once?

Level 2 ●○○

3 Photo postcards

Notes

Essential resources

calculators

Examples of lead-in questions

Helen orders 20 cards.
What will be the cost of each card?

Salim orders 25 cards.
What is the total cost of these cards?

How much would first class postage be for 100 cards?

Points to note

- This work is intended to give learners experience in interpreting a table, a process that is not always straightforward (see also 'Business cards' on pages 22–23, where each price is for a batch, rather than per item as here).
- In the Jamie's postcards task there may be some discussion on how to apply the Special Delivery charge. It is a flat fee for all orders and is added to the first class postage; learners may need time to sort this out for themselves.
- Similar work could be based on price tables in other vocational areas.

Level 2 ●○○

3 Photo postcards

Task sheet (1 of 1, no separate data sheet)

Photocard is a company that prints postcards from digital pictures.
The information below is from their website.

Postcards

New house, new baby, new pet…?

Let your family and friends know with one of our postcards.
Just choose your picture, and write your message.

We'll do the rest!

Postal charges

Quantity	1	2–9	10–19	20–49	50+
UK first class	£1.49	£1.99	£3.99	£4.99	£6.99
Special Delivery	+ £5.00				

Price information

Quantity	Price each
1	£0.85
2–9	£0.75
10–19	£0.70
20–49	£0.65
50–79	£0.60
80+	£0.55

Your postcards

You want to order 5 postcards.

- What is the cost of one of these cards?
- What will be the cost of the 5 postcards?
- What will be the cost including first class postage?

Anne's postcards

Anne wants to order 30 postcards.

- What will be the total cost of these cards, including first class postage?

Jamie's postcards

Jamie wants 60 postcards delivered very quickly.

- What will be the total cost of these cards sent Special Delivery?

Level 2 ●○○

4 Water meter

Notes

Essential resources

calculators

Examples of lead-in questions

What is the metered water charge estimate for an annual use of 210 cubic metres in a detached house?
How much less would you pay for a semi-detached house?

Points to note

- The data here is based on information provided by one water company. Costs will differ depending on the water company involved (for details, search on water company names).
- The charges are different for different types of house because a standing charge is added to the cost of metered water used. The standing charge depends on the size and type of house and includes costs for highway and surface water drainage. Highway drainage covers rainwater draining from the highway into the public sewers from gullies on the road. Surface water is rainwater falling on to the property and running through guttering and drainpipes into the public sewer, as well as water that enters the sewer from activities such as car washing.
- The information provided in the task is about a fictional family, and assumptions will need to be made about their use of water. Learners could instead find out the relevant information for their own family and work out whether they would save with a water meter. Those who already have a water meter could first estimate how much water they use and then compare that with the amount on their last water bill.
- Some learners may not notice that the number of toilet flushes is per day rather than per week and may get a large figure for toilet flushes compared with the other figures. Encourage them to go through their working looking for values that seem out of line with the rest.

Level 2 ●○○

4 Water meter

Task sheet (1 of 1)

Households have to pay for their water supply.

They are either charged an annual fixed fee called water rates or, usually in newer houses, the charge is based on the amount of water they use, which is measured by a water meter.

Any household can choose to have a water meter fitted, free of charge, and this may save them money.

The Jones family do not have a water meter but pay £643.75 annually for their water rates.

- There are four people in the house – two adults, one five-year-old and one thirteen-year-old.
- Both adults go out to work full time and the children go to school.
- They have one car.
- They do not have a swimming pool.
- They use a hosepipe to wash the car about once a month.
- They collect rainwater to water the garden.
- Their house is detached.

They think they might save money by having a water meter fitted.
The data sheet shows information their water company has provided to help them estimate how much water they use each year and how much money they would pay for it.

Deciding whether a water meter would save money

▶ Estimate how much water the Jones family use in a year.
State clearly any assumptions you make.

▶ Do you recommend the Jones family have a water meter fitted?

Level 2 ●○○

4 Water meter

Data sheet (1 of 1)

Estimating your annual use of water in cubic metres

Total number of baths per week	× 6
Total number of showers per week	× 2
Number of toilet flushes per day	× 3.5
Number of washing machine uses per week	× 6*
	× 3**
Number of dishwasher uses per week	× 2*
	× 1**
Number of days hosepipe or sprinkler used per year	× number of hours per day
Do you have a swimming pool?	Number of cubic metres per year used to fill it or top it up
Water for general use (washing, drinking, etc.):	
Number of people in your house	× 15

Add up these results to estimate how much water your household uses each year.

* machines bought before the year 2000 ** machines bought in 2000 or later

Estimating the annual charge for metered water

Annual use of water in cubic metres	Type of property		
	detached	semi-detached	other
	£	£	£
45	205	178	152
60	253	209	182
80	276	249	223
105	327	300	273
120	357	331	304
140	398	371	345
150	418	391	365
165	448	422	395
170	459	432	406
195	509	483	456
210	540	513	487
250	621	595	568
290	702	676	649
310	743	717	690
350	824	798	771
400	926	900	873
500	1129	1103	1076
600	1332	1306	1279

Level 2 ●○○

5 Railway walk

Notes

Essential resources

pieces of string

Examples of lead-in questions

It is Sunday 23 August.
Which timetable do you look at?
You arrive at Pickering at 12:30 p.m.
What is the time of the next train to Grosmont?

On Monday 3 August you catch the train that leaves Whitby at 11:00 a.m.
When does it get to Levisham?

Points to note

- Learners can use the string and the scale marked on the map to estimate the length of the route.
- It is worth discussing how long it might take to walk a certain distance over different sorts of countryside and in different weather conditions.
- Up-to-date timetables for the North Yorkshire Moors Railway are at www.nymr.co.uk .
- It is also worth doing journey planning tasks using sites such as www.nationalrail.co.uk and www.traintimes.org.uk, which search for trains around a time the user specifies for a certain date, and do not present the entire timetable.
- Journey planning tasks can be set in many vocational contexts.

Level 2 ●○○

5 Railway walk

Task sheet (1 of 1)

You are on holiday in North Yorkshire and are planning a day out.

The North Yorkshire Moors Railway runs between Pickering and Whitby.
You are staying in Pickering and plan to get a train to Levisham, go for a walk and then catch a train back to Pickering.

Some friends have told you they had a beautiful walk on the footpath beside the railway from Levisham to Goathland. You would like to try this walk.
You need to allow enough time to walk the route and to stop for some rest breaks.
A map and train times are on the data sheet.

You are planning to do the walk on Sunday 9 August.

Deciding on trains

▶ Which train should you catch from Pickering and which train would you expect to catch from Goathland to get back to Pickering?
Explain how you made your decisions.

Level 2 ●○○

5 Railway walk

Data sheet (1 of 1)

North Yorkshire Moors Railway

2009 peak period timetables

Monday to Saturday

Pickering	dep	0900	1000	1100	1200	1300	1400	❶1500	1600	1700
Levisham	dep	0920	1020	1120	1220	1320	1420	1520	1620	1720
Newtondale Halt RS	dep	–	1029	1129	1229	1329	1429	1529	1629	1729
Goathland	dep	0948	1050	1150	1250	1350	1450	1550	1650	1750
Grosmont	arr	1005	1105	1205	1305	1405	1505	1605	1705	1805
Grosmont	dep	1010	*1144*	–	1310	–	*1518*	–	1710	*1844*
Whitby	arr	1035	*1205*	–	1335	–	*1539*	–	1735	*1905*
Whitby	dep	*0845*	–	1100	–	*1241*	1400	–	*1550*	1800
Grosmont	arr	*0902*	–	1122	–	*1258*	1422	–	*1607*	1822
Grosmont	dep	0930	1030	1130	1230	❶1330	1430	1530	1630	1825
Goathland	dep	0950	1050	1150	1250	1350	1450	1550	1650	1840
Newtondale Halt RS	dep	1003	1103	1203	1303	1403	1503	1603	1703	–
Levisham	dep	1020	1120	1220	1320	1420	1520	1620	1720	1905
Pickering	arr	1040	1140	1240	1340	1440	1540	1640	1740	1930

Sunday

Pickering	dep	❷1000	1100	1200	❷1300	1400	–	–	1600	–
Levisham	dep	1020	1120	1220	1320	1420	–	–	1620	–
Newtondale Halt RS	dep	1029	1129	1229	1329	1429	–	–	1629	–
Goathland	dep	1050	1150	1250	1350	1450	–	–	1650	–
Grosmont	arr	1105	1205	1305	1405	1505	–	–	1705	–
Grosmont	dep	–	–	–	–	*1518*	–	–	*1844*	–
Whitby	arr	–	–	–	–	*1539*	–	–	*1905*	–
Whitby	dep	*0845*	–	–	–	*1241*	–	*1550*	–	–
Grosmont	arr	*0902*	–	–	–	*1258*	–	*1607*	–	–
Grosmont	dep	1030	❷1130	1230	–	1430	❷1530	1630	–	–
Goathland	dep	1050	1150	1250	–	1450	1550	1650	–	–
Newtondale Halt RS	dep	1103	1203	1303	–	1503	1603	1703	–	–
Levisham	dep	1120	1220	1320	–	1520	1620	1720	–	–
Pickering	arr	1140	1240	1340	–	1540	1640	1740	–	–

Notes

❶ **Train runs on Tuesdays, Wednesdays and Thursdays only** and will normally be operated by a heritage scenic diesel railcar or diesel locomotive.

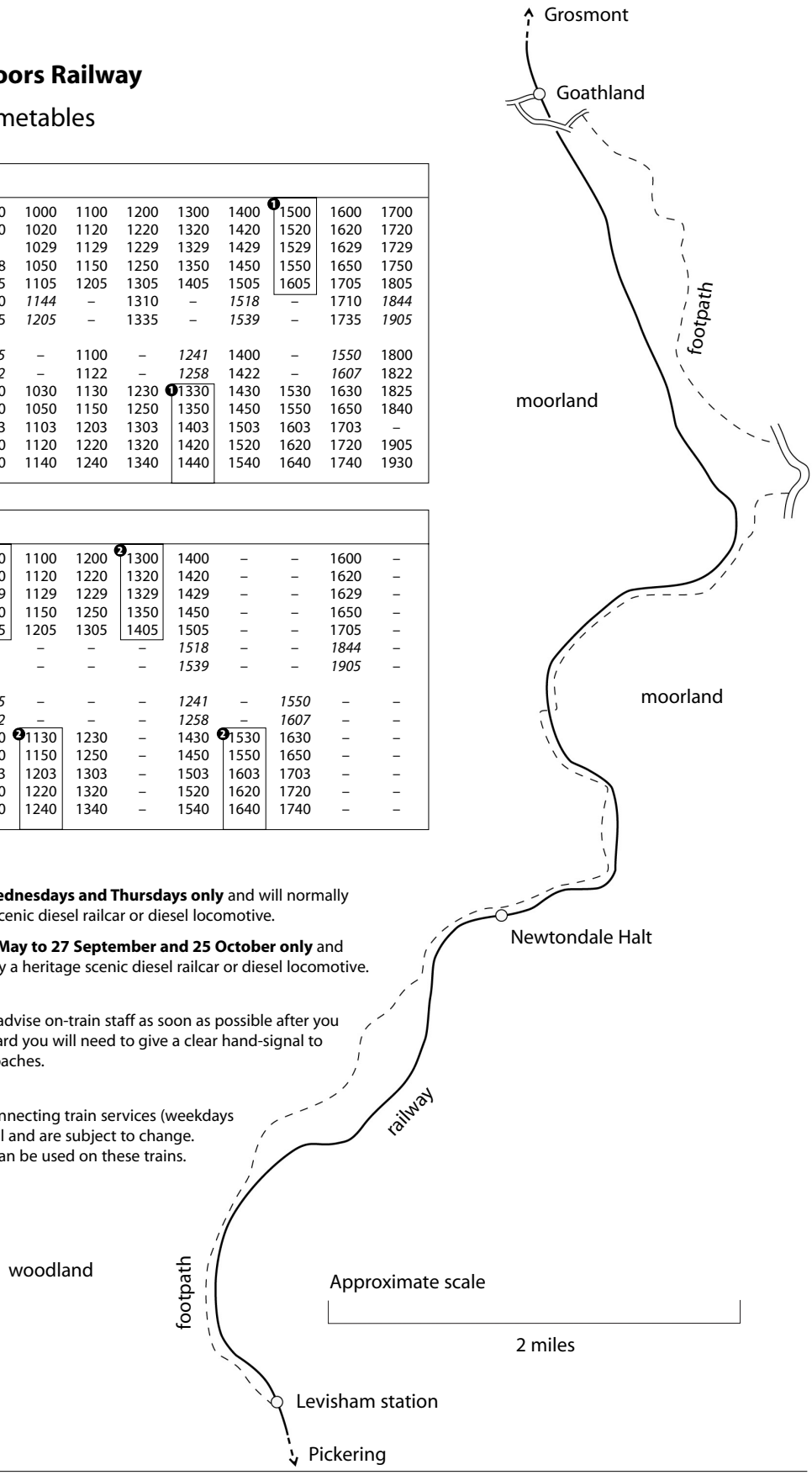
❷ **Train runs on Sundays 17 May to 27 September and 25 October only** and will normally be operated by a heritage scenic diesel railcar or diesel locomotive.

RS Request Stop:

If you wish to alight please advise on-train staff as soon as possible after you have joined the train. To board you will need to give a clear hand-signal to the driver as the train approaches.

Northern Rail

Times shown in italics show connecting train services (weekdays only) operated by Northern Rail and are subject to change. NYMR tickets to/from Whitby can be used on these trains.



Level 2 ●○○

6 Keeping fit

Notes

Essential resources

calculators

Optional resources

access to spreadsheet package

Examples of lead-in questions

How many calories would an 80 kg man use playing golf for two hours?

How many calories would a 60 kg woman use running for 15 minutes at 10 km/h?

What activities could a 70 kg person do that would burn at least 700 calories in an hour?

Points to note

- This task lends itself to the use of a spreadsheet.
- NHS guidelines state that the recommended daily amounts of exercise can be made up of shorter bursts of activity spread out through the day.
- The calorie figures in the table are approximate. So learners can round their weight to the nearest 10 kg, rather than try to interpolate values.
- Learners may want to know the figures for activities that aren't included on the list (try searching on 'calories exercise').

Level 2 ●○○

6 Keeping fit

Task sheet (1 of 1)

On the data sheet there is some information that James found about how much exercise an adult should do to stay healthy.

He keeps an exercise diary for a week to see whether he is doing enough exercise.

My exercise diary

Monday	*walked briskly to work (15 minutes)*
Tuesday	*five-a-side football (45 minutes)*
Thursday	*cut grass (20 minutes)*
Saturday	*swimming moderate (30 minutes)*

James's exercise

▶ Did James do enough exercise this week to meet the recommended activity levels for adults?

Using calories

James weighs 90 kg.

▶ Estimate the quantity of calories he has used exercising this week.

Advising James

James decides that he wants to become fitter and lose some weight.
He wants to increase the quantity of calories he uses by doing more exercise.

He easily gets bored with exercise so wants some variety in what he does.
He wants to follow the guidelines for staying healthy but doesn't want to spend more than an hour a day exercising.
He lives about 2 km from where he works and is a member of a health club.

▶ Suggest to James what he could do each week and how many calories it would use.

Your exercise

▶ Do you do enough exercise to meet the recommended activity levels?

▶ About how many calories did you use exercising last week?

6 Keeping fit

Data sheet (1 of 1)

Recommended activity levels for adults

To help you stay healthy, you should do a minimum of 30 minutes of moderately intense physical activity at least five days a week.

It can include walking or cycling part of your journey to work, using the stairs or doing manual tasks.

Your routine could involve two or three more intense sessions, such as a sporting activity, the gym or swimming.

Recommended activity levels for children and young people

Aim to do at least 60 minutes of moderately intense physical activity each day.

At least twice a week this should include activities to strengthen bone and muscle, and increase flexibility.

Approximate quantity of calories (energy) burned during 1 hour of activity

Activity	Body weight					
	40 kg	50 kg	60 kg	70 kg	80 kg	90 kg
Badminton	179	224	269	314	359	403
Basketball	320	401	481	561	641	721
Circuit training	320	401	481	561	641	721
Cricket, batting/bowling	200	250	300	350	400	450
Cutting grass	219	274	328	383	438	493
Cycling, moderate effort	320	401	481	561	641	721
Dancing, aerobic	241	301	362	422	482	542
Football	410	502	602	702	802	903
Golf	200	250	300	350	400	450
Housework, general	140	175	209	244	279	314
Jogging	279	349	419	489	559	628
Rowing machine, moderate effort	340	424	509	594	679	764
Running, 10 km/h	401	502	602	702	802	903
Running, 12 km/h	500	625	750	875	999	1124
Squash	481	601	721	841	961	1081
Swimming, moderate effort	320	401	481	561	641	721
Tennis	241	301	362	422	482	542
Walking, moderate pace	140	175	209	244	279	314
Walking, brisk pace	160	200	240	280	320	360
Yoga	160	200	240	280	320	360

Level 2 ●●○

7 Fine Framers

Notes

Essential resources

calculators
rulers

Examples of lead-in questions

What is the width of the Heirloom moulding?

What is the cost of 2 square metres of plain glass?

What is the cost of 0.5 metres of Driftwood moulding?

Points to note

- The formulas are derived from the method used in a real framing shop. The area factor and perimeter factor incorporate multipliers that the shop uses to allow for labour, profit, wastage, costs of running the shop and materials such as sticky tape and hooks, as well as to deal with the conversion from millimetres to metres.
- Learners could find out about similar 'mark-up' methods used to calculate prices in other vocational areas.
- Learners could extend the task to look at what happens to the price of framing as the width and height change. For example, if you double the width and height do you double the price?

Level 2 ●●○

7 Fine Framers

Task sheet (1 of 1)

You work in Fine Framers.
Mr Reynolds wants you to frame his painting shown above (full-size).
He is happy to follow your advice on the width of border.
He is choosing between

- Rainbow moulding in blue with matching mountboard and plastic glass
- Driftwood moulding in natural with matching mountboard and traditional glass

Framing methods and prices are shown on the data sheets.

Advising Mr Reynolds

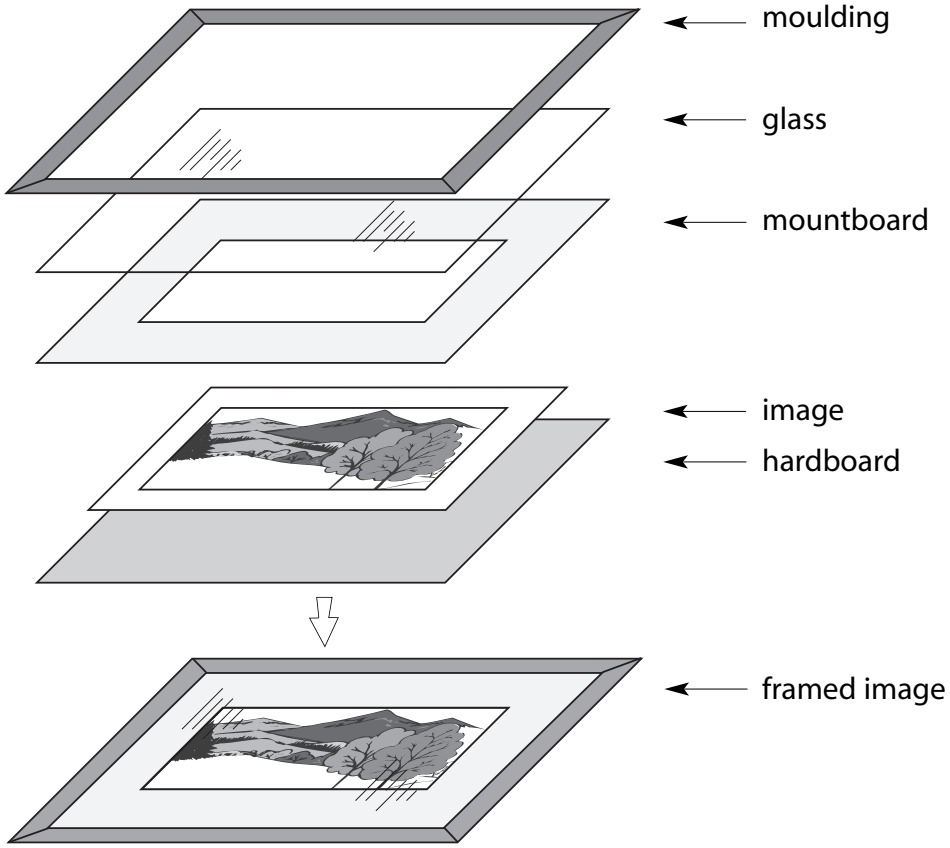
▸ How much will it cost him for each frame?
Show all your working carefully.

Level 2 ●●○

7 Fine Framers

Data sheet (1 of 2)

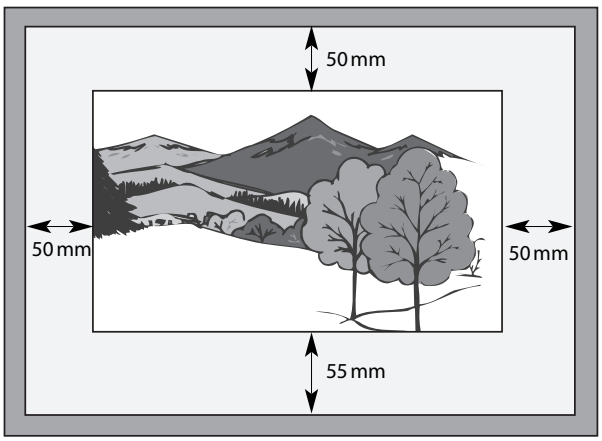
The layers in a framed image



The glass, mountboard and hardboard are all cut with exactly the same width and height. The moulding overlaps the mountboard by 5 mm along each edge.

Size of mountboard

We advise that you choose a size of mountboard to create a border of 50 mm round the top, left and right side of the image and a border of 55 mm at the bottom edge.



Our price

Our price is based on the cost of the moulding, glass and mountboard that you choose.

The way we calculate the price adds in our time, our running costs and the cost of cheaper items such as hardboard, string and clips.

Mountboard

Our mountboard comes in a variety of colours and costs £5.29 per square metre. Samples are on the display stand.

Glass

Glass is traditional or plastic (each 2 mm thick).

Glass	Cost per square metre
Traditional	£6.50
Plastic	£7.99

Moulding

Each range comes in a variety of colours, with samples on the display stand.

Range	Material	Width	Cost per metre
Rainbow	Wood	14 mm	£3.50
Driftwood	Wood	28 mm	£3.99
Modern	Acrylic	18 mm	£3.00
Heirloom	Wood	30 mm	£4.50
Metal	Metal	6 mm	£3.00

Calculating the price for the customer (who takes our advice on the width of border)

- Measure in mm the width of the image the customer wants framed and add on 110. Call this the **width**.
- Measure in mm the height of the image and add on 115. Call this the **height**.
- Work out (width × height) ÷ 200 000 and call this the **area factor**.
- Work out 2 × (width + height) ÷ 165 and call this the **perimeter factor**.

Mountboard

- Multiply the area factor by the cost of the mountboard per square metre.

Glass

- Multiply the area factor by the cost of the glass per square metre.

Moulding

- Multiply the perimeter factor by the cost of the moulding per metre.

The total price for the customer is **mountboard + glass + moulding**.

Level 2 ●●○

8 Radiator

Notes

Essential resources

calculators

Examples of lead-in questions

What is the output of a single radiator with a length of 1200 mm and a height of 400 mm?

How many radiators listed have an output of more than 5000 BTU per hour?

Points to note

- This task is quite involved, but the first data sheet leads learners through the calculations step by step.
- 'South facing' in the room specification means the patio doors face south. No correction factor needs to be applied for this.
- The information on the data sheet is typical of that provided by DIY companies and plumbers' suppliers. There is a lack of clarity about how to find the 'total correction factor' and learners will need to make their own decision about what to do.
- Learners may have difficulty in keeping track of all the features giving rise to correction factors. You could suggest they highlight features once they have included them in their calculations.

Level 2 ●●○

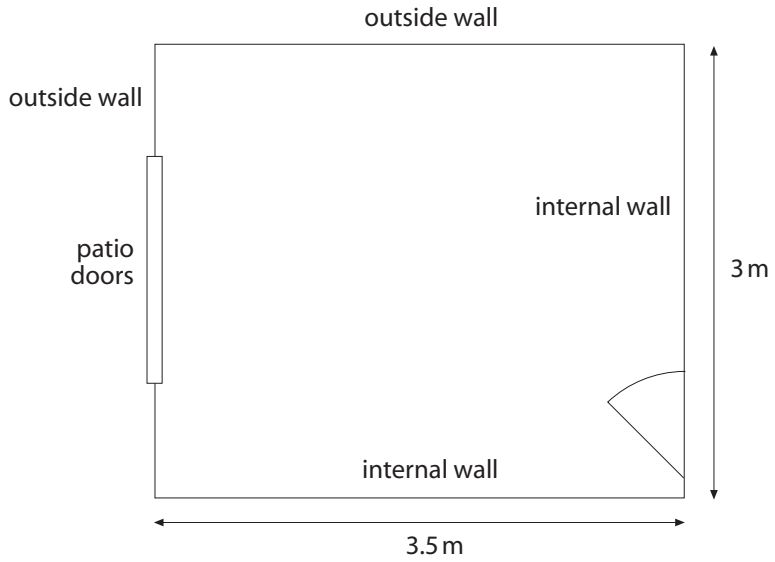
8 Radiator

Task sheet (1 of 1)

The correct size of a central heating radiator for a room depends on the dimensions of the room and what the room will be used for.

Gethin is having an extension built on his house.
The new room will be a dining room which needs a radiator.

Here is the plan of the new room.



Room specification

- south facing
- solid floor
- double glazing
- foam filled cavity walls
- ceiling height 2.4 m

Choosing a suitable radiator for the room

You work for the plumbers who are fitting the new radiator.

Gethin doesn't want the radiator to take up too much of the wall space.
He says it should be a maximum of 1 metre long.

▶ Use the information on the data sheets to suggest a suitable radiator for this room.
Show how you made your decision.

8 Radiator

Data sheet (1 of 2)

Choosing the size of a radiator

The output of a radiator is measured in British Thermal Units per hour (BTU per hour). For any given room you need a radiator with sufficient capacity to heat that room to a satisfactory temperature level.

You need to calculate the required heat output for the room then select a suitable radiator, either a single or a double, which will fit in the room conveniently.

In larger rooms two radiators may be needed to reach the required output, and they should ideally be positioned on opposite sides of the room.

Calculating your heat requirement

Step 1

Calculate the volume of the room in m^3.

Step 2

Calculate the required heat output.

heat output (BTU per hour) = room volume × room factor

Room type	Room factor
living, dining, bathroom	177
bedroom	141
kitchen, stairs, hallway	106

Step 3

Find the total correction factor.

north facing	+15%	patio doors	+20%
two outside walls	+15%	double glazing	−10%
three outside walls	+40%	foam filled cavity walls	−20%
high ceiling (> 3 m)	+20%	solid floor	−10%

Step 4

Calculate the adjusted heat output using the correction factor.

Step 5

Select the radiator of the required size best suited to the estimated heat output that you have calculated.

Note

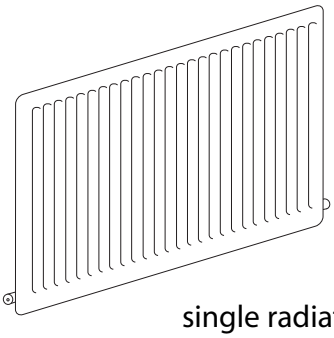
It is unlikely that a radiator will meet the heat requirements exactly, so it is generally recommended that you buy a radiator that is the size above what you think you need.

Recommended room temperatures

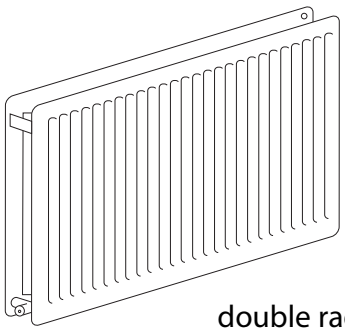
living and dining	21 °C
kitchen	16 °C
bedroom	15 °C
bathroom	21 °C
stairs/hallway	18 °C

Radiator sizes and outputs

Length	Single		Double
	400 mm high (BTU per hour)	600 mm high (BTU per hour)	600 mm high (BTU per hour)
mm			
400		1414	2653
500		1768	3316
600	1501	2122	3979
700		2475	4642
800		2829	5305
900	2252	3182	5968
1000		3536	6631
1100		3889	7293
1200	3002	4243	7958
1400		4950	9284
1600		5657	10610



single radiator



double radiator

Level 2 ●●○

9 Broadband

Notes

Essential resources

calculators

Examples of lead-in questions

How many gigabytes would a 45 minute TV programme use?

How much would you be charged in a month if you were on Option 2 and downloaded 21.3 GB that month?

Points to note

- Learners may just compare the options that have the capacity for the monthly data download Gavin wants, and not consider whether it would be cheaper to choose Option 1 and be charged for going over the limit by a few GB.
- Learners may want to carry out this task based on their own internet use rather than Gavin's, and current broadband prices (try searching on 'broadband deals').
- The number of megabytes of download is fixed for a given TV programme but the time taken to download it depends on the speed of the internet connection.

Level 2 ●●○

9 Broadband

Task sheet (1 of 1)

Gavin is choosing a new broadband deal.
He looks at some deals and finds there is sometimes a limit to the amount of data that can be downloaded each month.

He realises he needs to estimate the number of gigabytes of data he is likely to download in a month to help him choose the most economical package.

He uses the internet for surfing and emailing, downloading music tracks and TV programmes, and listening to the radio.

He estimates that he

- downloads about 4 hours of TV programmes every week
- listens to internet radio for about an hour every day
- downloads about 20 music tracks every month
- uses about 1 GB each month for general surfing and email

Gavin finds some information about the number of gigabytes needed to download TV and radio programmes.

He knows that the number of gigabytes needed for a music track depends on the length of the track. He finds out the sizes of some of his music tracks so that he can make an estimate of how many gigabytes he will need for music downloads.

All this information is on the data sheet.

Choosing a broadband package

▶ Suggest to Gavin which package he should choose.
Explain how you reached your decision.

Level 2 ●●○

9 Broadband

Data sheet (1 of 1)

Quantities of computer data are measured in gigabytes (GB) and megabytes (MB).

1 GB ≈ 1000 MB

The speed of an internet connection is measured in megabits per second (Mbps).

Broadband packages

Option 1

Up to 8 Mbps download speed
10 GB monthly data download
£15.65 per month

Option 2

Up to 8 Mbps download speed
20 GB monthly data download
£20.54 per month

Option 3

Up to 8 Mbps download speed
Unlimited data download
£24.46 per month

If you exceed your monthly data download allowance on any of these options, you will be charged £1 for each extra GB you download (rounded up to the nearest GB).

Approximate download sizes

TV programmes 650 MB per hour of programme

Radio programmes 13 MB per hour of programme

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*		

Level 2 ●●○

10 Designing games

Notes

Essential resources

Game 1: each player needs about 25 counters of one colour; each pair of players needs two dice.

Game 2: each pair needs about 40 counters and a dice.

Example of a lead-in question

Roy is playing Game 1.
His first throw is a three on one dice and a two on the other.
Where on the board can he cover a square?

Points to note

- A blank 6 by 6 game board is provided for the improved Game 1 but learners may think the game is enhanced by reducing or enlarging the size of the board and want to draw out a new one.
- Some learners may be interested in trying to design a better game board for Game 2 but the main task is to try and analyse what is wrong with the current game. Encourage them to look at the whole board and not just the first problematic part.

Level 2 ●●○

10 Designing games

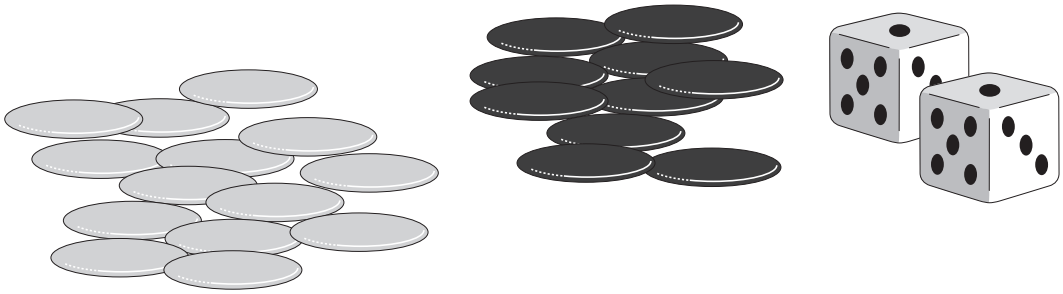
Task sheet (1 of 2)

Kelly is trying to design some games.

The first one is for fairly young children.
It is to help them practise adding up pairs of small numbers.

Game 1 (board on Data sheet 1)

- This is a game for two players.
- You need a supply of counters (each player has counters of one colour) and two six-sided dice.



- Players take turns to roll the two dice once on each turn.
- Add up the scores on the dice to get your total.
- You can cover one number on the board that matches your total.
- No more than one counter can go on any square.
- The winner is the first player to cover four numbers in a row (across, down or diagonally).

Improving the game

Kelly is not pleased with this game and thinks it needs some changes.

▶ Play the game with someone.

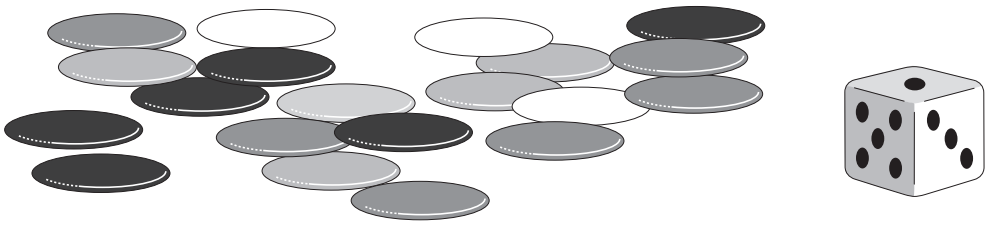
▶ How would you improve Kelly's game?
Describe your ideas clearly and explain why you would make each change.
Design a new board for her game. (There is a blank board you can use on Data sheet 2.)

You may need to play the game a few times to be clear about the best changes to make.

The second game is for very young children and involves collecting counters for points.

Game 2 (board on Data sheet 3)

- This is a game for two players.
- You need a supply of counters (mixed colours is fine) and one six-sided dice.
- You also need two different coins or counters to move round the board.



- Each player starts with 10 counters.
  Each counter is worth 1 point.
- Players take turns to roll the dice and follow the directions on the board.
- If you run out of counters your opponent wins.
- When one person reaches the last square (you don't have to land on it exactly), the player with the most points is the winner.

Improving the game

Kelly is not pleased with this game either and thinks it needs some changes.

▶ Play the game with someone.

▶ How would you improve Kelly's game?
Describe your ideas clearly and explain why you would make each change.

You may need to play the game a few times to be clear about the best changes to make.

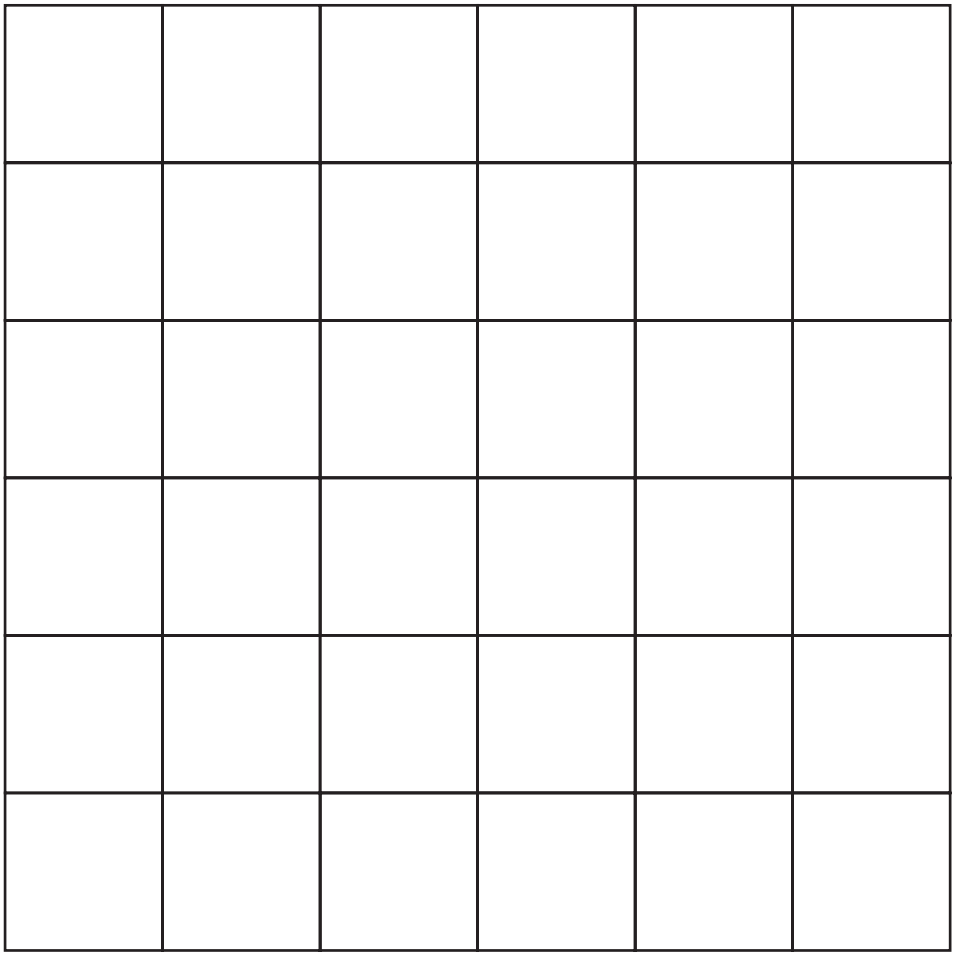
10 Designing games

Data sheet (1 of 3)

Game 1

1	4	5	6	7	1
11	12	3	2	12	8
10	2	12	12	3	9
9	3	12	12	2	10
8	12	2	3	12	11
1	7	6	5	4	1

Game 1



Game 2

1 START	2 Win 5 points	3 Lose a point	4 Give your opponent a point	5 Win 10 points	6 Lose half your points	7 Lose 2 points
						8 Go back 4
23 Go forward 4	24 Go back 1	25 Go forward 2	26 Go back 3	27 Lose all your points		9 Go back 2
22 Take 5 points from your opponent				28 Win a point		10 Go back 3
21 Treble your points		31 END	30 Go back 2	29 Win 5 points		11 Lose 5 points
20 Hello ☺						12 Go back 3
19 Lose 5 points	18 Take 2 points from your opponent	17 Win 8 points	16 Go back 3	15 Hello ☺	14 Double your points	13 Lose half your points

Level 2 ●●○

11 New TV

Notes

Essential resources

calculators

Examples of lead-in questions

How much would 200 units of electricity cost?

If I run a 500 watt appliance for 4 hours, how many units do I use?

Points to note

- Electricity unit prices are often banded.

The price given here is an approximate value for the lower unit price, assuming that the smaller number of units at the higher price will have been used for unavoidable purposes such as essential lighting, refrigeration etc.

- Learners will need to make assumptions about the number of hours the TV might be on.
- As an extension activity, learners could be asked how long it would take them to make up the price difference between the two TVs.
- Some electricity tariffs offer different unit prices at different times of day. Few households use these types of tariff, but learners could investigate whether this makes a difference to the costs.
- TV prices are changing very rapidly so it is worth updating this task with current information (try searching on 'TV review').

Level 2 ●●○

11 New TV

Task sheet (1 of 1)

Eco-friendly TV

New LED TVs have up to 40% less power comsumption and are recyclable and environmentally friendly, with n

You are planning to buy a new television.

You are concerned about the amount of electricity used by the TV and have read that LED TVs are more energy efficient than plasma TVs.

You find some information about the two models of TV you are interested in. This is on the data sheet.

The LED TV is much more expensive than the plasma TV, and you want to know whether the money you will save in electricity costs will make up the difference in prices between the two models.

Deciding on a TV

- Estimate how much electricity you will save in a year by having an LED TV rather than a plasma TV.
- Which TV do you think you should buy and why?

State any assumptions you make.

Level 2 ●●○

11 New TV

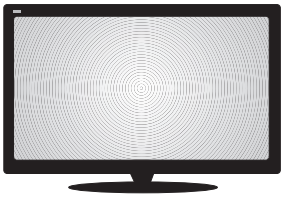
Data sheet (1 of 1)

40 inch LED Digital Television
HD ready
£1299

Free 5 year guarantee

Operational power consumption 220 watts

42 inch Plasma Digital Television
HD ready
£649



Free 5 year guarantee

Operational power consumption 380 watts

How to calculate appliance running costs

To work out how much electricity an appliance uses, you must have three values:

- the power rating or wattage of the appliance (found on the appliance)
- the length of time the appliance is on
- the cost per unit of electricity

Step 1

Find the amount of electricity used in kilowatt hours (kWh), also called 'units'.

Amount of electricity (kWh) = rating in watts ÷ 1000 × hours used

Step 2

Find the cost of the electricity.

Cost of electricity used (in pence) = amount of electricity (kWh) × price per unit

Electricity price

Normal units: 10.1 pence per unit approximately

Level 2 ●●○

12 Digital prints

Notes

Essential resources

calculators

Optional resources

photographs
scales
objects weighing 500 g and 1 kg (e.g. bags of flour or sugar)

Examples of lead-in questions

How much would Company B charge for five 7″ × 5″ prints (without postage)?

How much postage would Company A charge for 400 prints?

Points to note

- This task builds on Business cards (pages 22–23) and Photo postcards (pages 24–25), which provide an introduction to interpreting price tables.
- Common sense has to be used, for example to see that each price is per print but the postal delivery charge is per order.
- Learners can base a judgement about the weight of the photographs on their own experience (possibly with the help of a weight they can compare with) or on weighing some photographs themselves.
- The task could be adapted to many vocational areas.

Level 2 ●●○

12 Digital prints

Task sheet (1 of 1)

The two data sheets show the prices and postage charges of four different companies who print digital photographs.
They all allow you to order online and will post the prints to you.

For each task, show your working carefully and state clearly any assumptions you make.

Your prints

You want to get 10 digital photographs printed as 10″ × 8″ prints.

▶ Which of these companies would be cheapest for these prints (including postage)?

Kay's prints

Your friend Kay wants to order 300 6″ × 4″ prints and 50 7″ × 5″ prints.
She wants to order them all from the same company.
She asks you to decide which of these four companies would be cheapest for her.

▶ What advice would you give her?

Level 2 ●●○

12 Digital prints

Data sheet (1 of 2)

Company A

Prints and enlargements (from online photos)	**Price (each)**
6″ × 4″ prints	9 p
7″ × 5″ prints	19 p
8″ × 6″ prints	40 p
10″ × 8″ prints	£1.20
12″ × 8″ prints	£1.20
Postage and packing: prints and enlargements	
1–50 prints	99 p
51–500 prints	£1.49
501+ prints	£1.99

Company B

Prices	**Quantity**				
Format	1–4	5–49	50–99	100–199	200+
6″ × 4″	£0.25	£0.19	£0.12	£0.07	£0.05
7″ × 5″	£0.35	£0.26	£0.17	£0.14	£0.13
9″ × 6″	£0.45	£0.33	£0.27	£0.22	£0.19
Postal delivery	£1.49	£1.49	£1.49	£1.99	Free
(Collection from store is free)					

Company C

Sizes		Prices
6″ × 4″	1+	£0.15 each
	50+	£0.10 each
	100+	£0.07 each
	150+	£0.05 each
7″ × 5″	1+	£0.20 each
	50+	£0.14 each
	100+	£0.12 each
	150+	£0.10 each
8″ × 6″	1+	£0.25 each
10″ × 8″	1+	£1.20 each
12″ × 8″	1+	£1.20 each

Mail order

Your order will be sent via Royal Mail.
For print orders please allow 5 days for processing and delivery.
Please note that a postage charge of £1.50 will be added to your order.

Company D

Standard prints	1–149	150–299	300–499	500+
Size				
6″ × 4.5″	£0.10	£0.08	£0.07	£0.05
6″ × 4″	£0.10	£0.08	£0.07	£0.05
5″ × 3.75″	£0.10	£0.08	£0.07	£0.05

Enlargement prints	1	5+	20+
Size			
7″ × 5″	£0.19	£0.17	£0.15
10″ × 8″	£1.19	£1.09	£0.99
12″ × 8″	£1.25	£1.20	£1.13
12″ × 10″	£2.99	£2.82	£2.61

Standard post & packaging	1 g–500 g	501 g–1000 g	1001 g–2000 g
UK first class	£1.35	£3.59	£4.49

Level 2 ●●●

13 Boxes for paper

Notes

Essential resources

calculators

Optional resources

scissors
rulers

Examples of lead-in questions

What are the dimensions of a sheet of A1 paper?

How many sheets of A6 paper would you need to cover a sheet of A5 paper?

How many sheets of paper are there in 6 reams?

Points to note

- Some learners may need to have the term 'net' explained to them.
- Cutting out and folding the practice net on Data sheet 2 gives the learner an idea of the lengths that have to match up, without giving away any information about the measurements needed in their own design.
- Some learners may have difficulty allowing for the 5 mm gap at each edge.
- Many companies use this design of box for five reams of paper and you should be able to find one in your school or college. The learners' completed nets for four reams of A4 paper can be compared with it.
- This could be adapted into a task to design a box for a product used in the learners' vocational area.

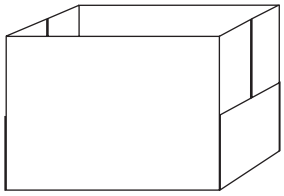
Level 2 ●●●

13 Boxes for paper

Task sheet (1 of 1)

BoxFold make a range of cardboard boxes.
For some of their boxes, they use a design that they call Four-cuts-and-fold-it.

The design instructions are on Data sheet 1.
There is a practice net and other information on Data sheet 2.



Four-cuts-and-fold-it

You work in the design department of BoxFold.
A local paper company asks you to design a box like this to hold four reams of A4 paper.

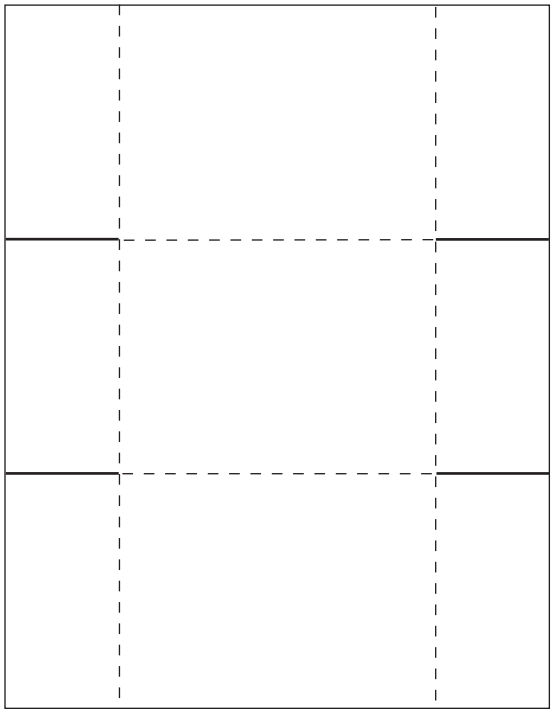
The company tells you that the thickness of 100 sheets of their paper is 11 mm.
They want a gap of 5 mm at each edge of the paper to get the paper in and out easily.

Your design

▶ Design a box for the paper company.

You will need to decide on the size of cardboard to use and where to make the cuts and folds. Show how you made your decisions.

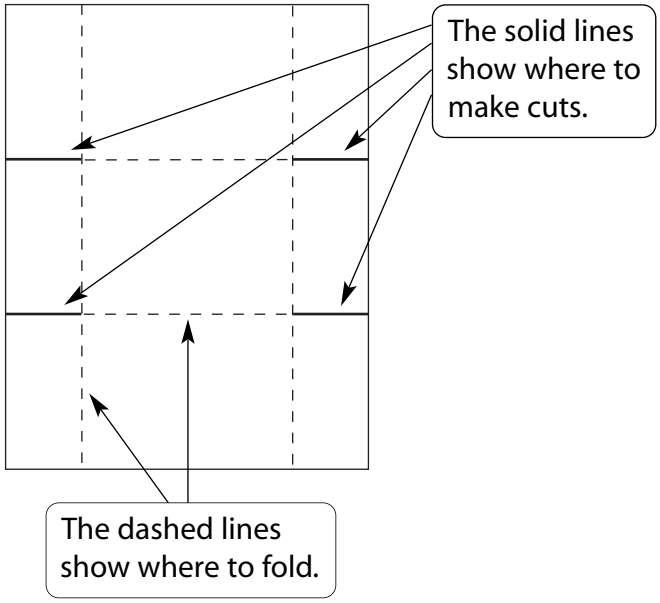
Draw a net like this and show on it all the measurements you need.



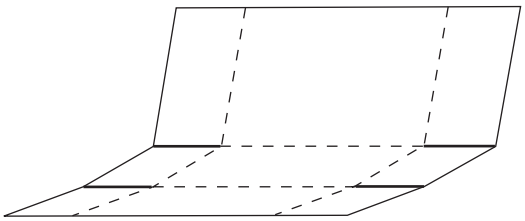
13 Boxes for paper

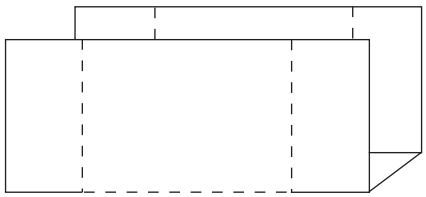
Data sheet (1 of 2)

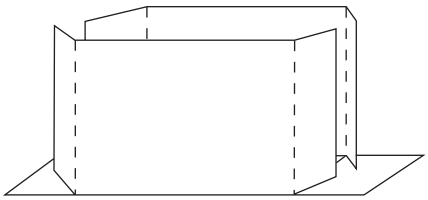
Four-cuts-and-fold-it design instructions

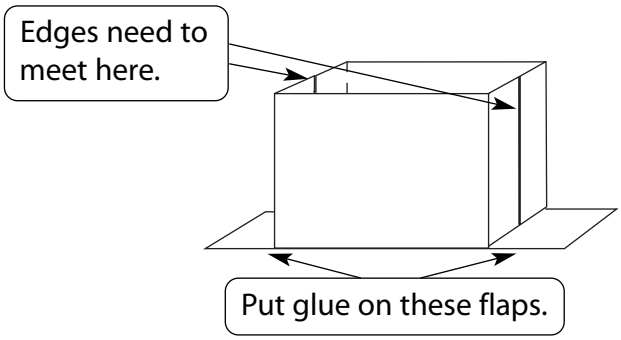


Fold up and glue the box as shown.

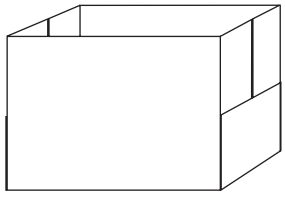






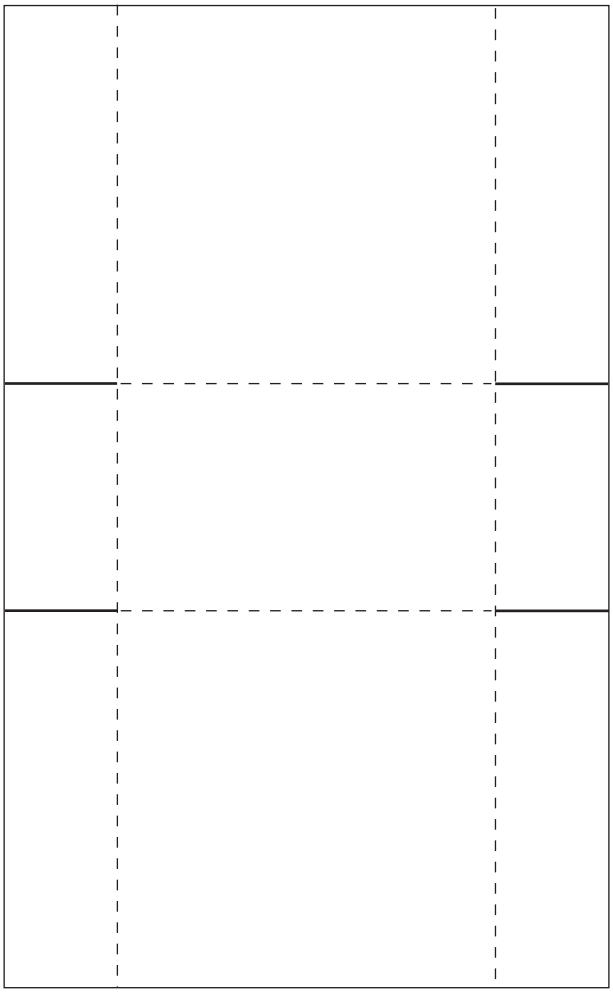


The final box



Practice net for new designers

Cut out and fold up the net to get a clearer idea of how a Four-cuts-and-fold-it box works.



International metric paper sizes

Paper size	Dimensions in mm
A0	841 × 1189
A1	594 × 841
A2	420 × 594
A3	297 × 420
A4	210 × 297
A5	148 × 210
A6	105 × 148
A7	74 × 105
A8	52 × 74
A9	37 × 52
A10	26 × 37

Units of paper quantity

25 sheets = 1 quire
500 sheets = 1 ream
1000 sheets = 1 bundle
5000 sheets = 1 bale

Level 2 ●●●

14 Weekend trip

Notes

Essential resources

calculators

Examples of lead-in questions

How much is the flight from Bristol to Glasgow on Friday 15 May at 19:35?

If a taxi leaves Taunton at 3.15 pm, roughly when would you expect it to get to Bristol Airport?

How much does the taxi company charge for a one-way taxi from Taunton to Heathrow?

How much would you pay for a checked bag that weighs 22 kg?

Points to note

■ Learners can plan their own weekend trip (try searching on airline names, 'cheap air flights', 'train timetables', 'taxi fares', 'route planner') or a business trip related to their vocational area.

Level 2 ●●●

14 Weekend trip

Task sheet (1 of 1)

Your mum lives in Hamilton in Scotland.
She decides at the last minute to have a 50th birthday party at home on Saturday 16 May.
She wants you to come and offers to pay £100 towards your travel costs.

You live in Taunton.
Your brother Jake lives near your mum in Hamilton and says you can stay with him.

You decide to fly from Bristol to Glasgow on Friday 15 May.
You will hire a taxi to and from Bristol Airport.
Jake works in Glasgow and will drive you to and from Glasgow Airport.
He finishes work at 5 p.m. each day from Monday to Friday.

You work full-time in Taunton.
You decide to take Friday off as leave but want to be back on Sunday evening to start work on Monday morning.

Your piece of hand baggage measures $48 \times 38 \times 14$ cm and weighs 4.5 kg when packed.
Your suitcase weighs 15 kg when packed.

Travel information is on the two data sheets.

Planning the trip

- Plan your journey to Hamilton for Friday.
What time will you ask the taxi to come?
- Plan your journey home to Taunton.
What time will you leave Hamilton?

Give all the relevant details for each journey.

- What are your total travel costs?

Clearly state assumptions you make in any of the work.

Level 2 ●●●

14 Weekend trip

Data sheet (1 of 2)

Flight times

Outbound ✈

Bristol to Glasgow: all flights Fri 15 May
○ **£23.99** dep. 07:10, arr. 08:25
○ **£45.99** dep. 16:15, arr. 17:30
○ **£31.99** dep. 19:35, arr. 20:50

Return ✈

Glasgow to Bristol: all flights Sun 17 May
○ **£55.99** dep. 13:40, arr. 14:50
○ **£45.99** dep. 21:15, arr. 22:25

Fares shown here are one-way, and **include all taxes and charges**.
Fees for checked ('hold') bags and sports equipment will apply.

Check-in

Passengers should present themselves at the appropriate check-in desks, which will normally open two hours before the scheduled time of departure.

Passengers who present themselves later than 40 minutes prior to the scheduled time of departure will not be accepted for travel, and will forfeit their seats.
It is recommended that you check in two hours before the scheduled time of departure.
Passengers must be able to quote their booking reference.
In some limited circumstances you may be able to transfer on to a later flight.

Baggage allowance and costs

Hand baggage

Passengers are permitted one standard piece of hand baggage to a limit of $55 \times 40 \times 20$ cm; no weight restriction applies within reasonable limits, i.e. a passenger must be able to place the piece of luggage safely in the overhead storage bins without assistance.

Checked baggage

Every item of standard checked ('hold') baggage will incur an online fee of £8.00 for each flight.
This fee gives you a total allowance of 20 kg.
Each kilogram above this allowance will incur a fee of £9.00 per kilogram.

Taxi fares from Taunton, Somerset

Airport	One-way	Return
Birmingham	£140.00	£270.00
Bristol	£50.00	£95.00
Cardiff	£120.00	£200.00
Dover	£220.00	£330.00
Exeter	£50.00	£95.00
Gatwick	£150.00	£280.00
Heathrow	£130.00	£260.00
City of London	£200.00	£360.00
Luton	£180.00	£360.00
Portsmouth	£110.00	£220.00
Poole	£130.00	£230.00
Southampton	£140.00	£265.00
Plymouth	£100.00	£190.00
Stansted	£200.00	£370.00

Driving times (average road and traffic conditions)

From	TA1 5RF Taunton	From	ML3 6QT Hamilton
To	Bristol Airport, Bristol	To	Glasgow Airport, Paisley
Distance	38.4 miles	Distance	22.9 miles
Time	0 hr 52 min	Time	0 hr 33 min

Level 2 ●●●

15 Rose bed

Notes

Essential resources

calculators
rulers

Optional resources

graph paper

Examples of lead-in questions

How many cubic centimetres are there in 2 litres?

How many bags of chipped bark should you buy if you need 120 litres?

Points to note

- This task involves a mix of units: centimetres, metres, feet and litres. Learners may need some practice converting between them.
- You may need to explain that 2 to 3 feet apart means 2 to 3 feet between the centres of the rose plants.
- It is quite tricky to fit all ten plants into Zara's rose bed keeping to the recommended spacings. It may help to work on graph paper. Learners may need to be reassured that a plant can be as close as 1 foot (0.3 m) from the edge of the rose bed (in other words, 2 feet apart means each plant 'owns' a space with 1 foot all round it, so the task can be thought of as fitting ten circles, each with radius 0.3 m, into the rectangle).
- Correct spacing of plants is important for successful gardening and should be used to work out quantities of plants before buying (try searching on 'plant spacing' and be ready for unmetricated values).

Level 2 ●●●

15 Rose bed

Task sheet (1 of 1)

Zara is making a new rose bed in her garden.

She has already cleared a patch of ground 1.5 metres by 2.8 metres and has mixed compost into the soil.

Zara finds out about a weed control fabric that she can cover the soil with to prevent weeds growing. She decides she will cover the rose bed with this fabric, and put the recommended amount of chipped bark over it once she has planted the roses.

She decides she will put ten rose plants in her rose bed.

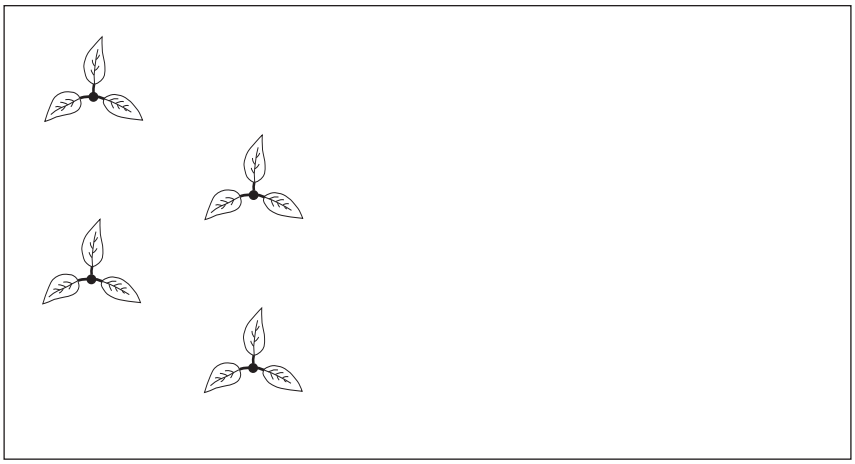
All the information she has found is on the data sheet.

What to buy

▶ Write a list of the things Zara will need to buy to complete the rose bed.

Planning the bed

Zara has started to draw a simple plan of how she will arrange the roses.



▶ Draw a simple plan of the rose bed, showing how Zara can fit in all ten rose plants.

Include some measurements to help her put the rose plants in the right place.

Level 2 ●●●

15 Rose bed

Data sheet (1 of 1)

Conversions

1 litre = 1000 cm^3

1 foot = 0.305 metre

Weed control fabric

A sheet of this fabric covering a flower bed will prevent weeds from growing.
It allows water through. It can last up to 5 years if covered to the recommended depth.

How to use the fabric

Step 1

Clear the ground. Rake the surface smooth.

Step 2

Cover the ground with fabric, overlapping sections by 5 cm to 7.5 cm .

Step 3

Cut crosses as required for the new plants to pass through.

Step 4

For longer life cover the surface with chipped bark or stone 5 cm to 7.5 cm deep.

Prices and sizes

Chipped bark (90 litre bag) £4.88

Weed control fabric (20 m × 1 m) £4.99

Rose plant £6.95 each

Advice on planting roses

Roses are best grown in open, well-ventilated areas, without too much shade.
Sunlight in your rose garden for at least three-quarters of the day is ideal.

Roses will grow in almost any soil, as long as it is well drained.
Mixing some well-rotted garden compost or manure into the planting area
will get your roses off to a flying start.

Rose plants should be placed about 2 to 3 feet apart.

Level 2 ●●●

16 Flapjacks

Notes

Essential resources

calculators

Examples of lead-in questions

How many calories are there in 50 g of butter?

What is the cost of 500 g of porridge oats (measured out of the 1 kg box)?

Points to note

- During piloting, one group of learners used a spreadsheet to help with the calculations and a publishing package to create their own posters.
- If you decide to make the flapjacks, then it is important not to allow them to become completely cold before removing them from the tin. They will break into pieces!

Level 2 ●●●

16 Flapjacks

Task sheet (1 of 1)

Marshall works for Frasers, a company that makes porridge oats.
He is running a stand at a food show.

He wants to show porridge oats can be used to make a variety of things, not just porridge.
He decides to make some flapjacks for his stand.

He decides to sell the flapjacks in bags of six.
He wants the price of each bag to cover the cost of the ingredients and packaging with 50p added on as a gift for charity.

The information he needs is on the data sheet.

Designing a poster

Marshall wants to put a small poster near the bags of flapjacks.
He wants it to include the number of calories in each flapjack and the price of each bag.

▶ Design a poster for him.

16 Flapjacks

Data sheet (1 of 1)

Flapjacks

Makes 16 square flapjacks

Ingredients

75 g butter
50 g light brown sugar
30 g (1 tablespoon) golden syrup
175 g porridge oats

Directions

1 Put the butter, sugar and golden syrup into a saucepan and stir over a low heat until the fat and sugar have melted.
2 Add the porridge oats and blend thoroughly.
3 Press into a well greased 18 cm square sandwich tin.
4 Bake in the centre of a moderate oven (gas mark 4 or equivalent) for 25 minutes or until evenly golden brown.
5 Mark into 16 squares while warm.
6 Allow to cool (but not become completely cold) and then remove from the tin.
7 Enjoy!

Nutritional information

All amounts given per 100 g

	Calories (kcal)
Butter	737
Light brown sugar	398
Golden syrup	325
Porridge oats	356

Costs

Ingredients

	Weight	Cost
Butter	250 g	£1.25
Light brown sugar	500 g	95 p
Golden syrup	454 g	98 p
Porridge oats	1 kg	£1.47

Packaging

	Quantity	Cost
Cellophane bags	50	£2.24
Decorative labels	76	£2.73

Level 2 ●●●

17 CD storage

Notes

Essential resources

calculators

Optional resources

a variety of CD cases
rulers

Examples of lead-in questions

What is the length of the shortest piece of timber in the list?

What is the width of a piece of planed timber that is 2700 millimetres long?
What is this width in centimetres?

Points to note

- It may help learners to have some different types of CD case so that they are aware of the variety of possible sizes as they decide on the shelf height and the width of timber to select. The dimensions of two common types of case are given on the data sheet.
- Learners may need to be reminded to include the thickness of the timber in their calculations for the height of the unit.

Level 2 ●●●

17 CD storage

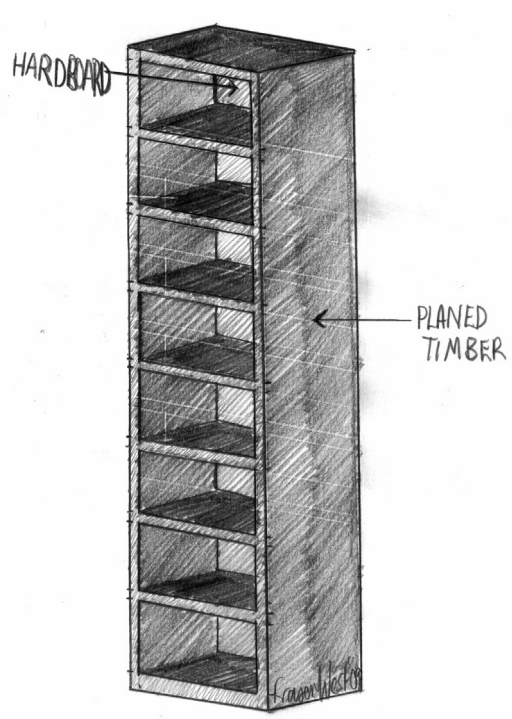
Task sheet (1 of 1)

Fraser has a collection of about 150 CDs.
He has 140 single CDs and 10 double CDs.
He asks you to design a storage unit for him to keep them all in,
with some extra space for when he buys more.
He wants a simple design that he can build himself, using materials on the data sheet.

He will use planed timber for the sides and shelves, and hardboard for the back.
He can saw the timber to the correct length and can cut hardboard to
the correct size.

He sketches a design idea for the storage unit.
He doesn't mind how many shelves it has or
what height it is.
He has a space about 50 cm wide to fit
the unit in his room.

There must be enough space between the shelves
to get a CD in and out easily.



Your design

▶ Suggest a suitable size for the storage unit.
Make a sketch of the unit, showing its dimensions.
Explain how you made your decision.

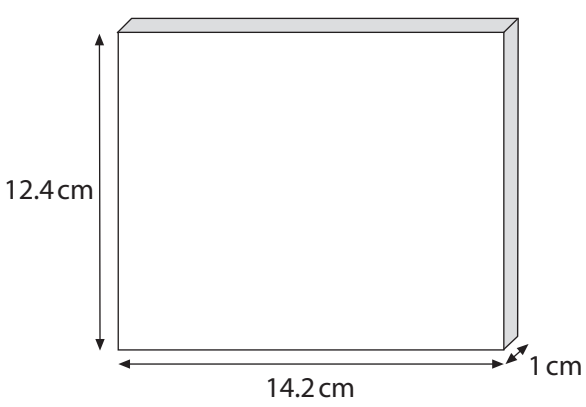
▶ Make a list of the materials needed to make the storage unit.
How much will the materials cost?

Level 2 ●●●

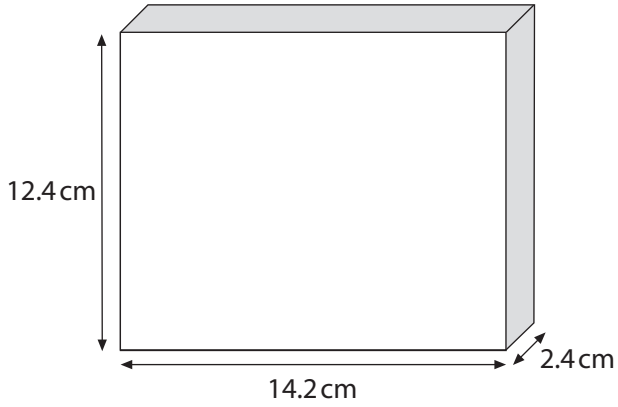
17 CD storage

Data sheet (1 of 1)

These are the approximate dimensions of plastic CD cases.



single CD



double CD

These are the sizes and prices of materials available from the local DIY store.

Planed timber

Length (mm)	Width (mm)	Thickness (mm)	Price
2100	144	18	£4.18
2700	144	18	£6.29
3600	144	20.5	£9.48
3600	169	20.5	£10.98
3600	194	20.5	£11.98

Hardboard

Length (mm)	Width (mm)	Thickness (mm)	Price
1220	610	3	£1.98
1819	610	3	£3.48
2440	1220	3	£4.48

Level 2 ●●●

18 Macaroni cheese

Notes

Essential resources

calculators

Optional resources

garlic
onions
tomatoes
eggs
scales (or some weights such as 50 g, 100 g and 200 g to estimate with)
access to a spreadsheet package

Examples of lead-in questions

How many calories are there in 200 ml of evaporated milk?

How much salt is there in 10 g of cheddar cheese?

Points to note

■ Learners are not given weights for the garlic, onion, tomatoes or eggs. They may notice that the calorie and salt content of the vegetables is very low and decide to ignore these items. Alternatively, they can judge the weights from their own experience (possibly with the help of a weight they can compare with) or they can weigh some items themselves. The eggs have a significant calorie and fat content and a judgment will need to be made about their weight.

■ Learners could produce a spreadsheet to do this task.

■ This task can provide a useful starting point for a discussion on healthy eating though this needs to be carefully handled if some participants are obviously overweight or underweight. One important thing that Aunt Geena does not consider is the amount of **saturated fat** in each recipe. Government guidelines on healthy eating state: 'saturated fat: having too much can increase the amount of cholesterol in the blood, which increases the chance of developing heart disease'. For example 200 g of cheddar cheese contains about 46 g of saturated fat and so each portion of macaroni cheese from either recipe will contain over 11 g of saturated fat, which is already over 50% of a woman's GDA. Learners could work out the total amount of saturated fat in a portion from each recipe. Aunt Geena may well be advised to limit her intake of macaroni cheese to the occasional treat!

■ Other important factors for a healthy diet are amounts of sugars, vitamins and other minerals besides salt. For vegetarians an adequate intake of different types of protein is important. Other recipes could be analysed for amounts of these components (try searching on 'nutritional values' and 'dietary requirements').

Level 2 ●●●

18 Macaroni cheese

Task sheet (1 of 1)

Your Aunt Geena loves macaroni cheese.
She has a favourite recipe that she has used for years.

She wants to cut down on her intake of calories and fat a bit to try and lose some weight.

She also wants to lower her salt intake as she knows that too much salt can lead to high blood pressure.

She finds a new recipe for macaroni cheese that uses evaporated milk and is a lot quicker and easier to make. She tries it out and likes it.
She wants to compare this recipe with her favourite one to see if it has fewer calories and less fat and salt.

She has found some nutritional information about the ingredients.

The bay leaf and nutmeg add flavour but have no significant nutritional value so she ignores them.

The ingredients and nutritional guidance are on Data sheets 1 and 2.

Choosing between the recipes

▶ Do you think your aunt should change to the new recipe?
Show how you made your decision.

Clearly state any assumptions you make.

18 Macaroni cheese

Data sheet (1 of 2)

GDAs

Guideline daily amounts (GDAs) are approximate levels of calories, carbohydrate, protein, fat, fibre and salt that are consistent with a healthy diet.

They apply to a person's average intake over several days.

The suggested daily levels of nutrition for an average man and woman are shown below.

	GDA for woman	GDA for man
Energy in calories (kcal)	2000	2500
Protein (g)	45	55
Carbohydrate (g)	230	300
Fat (g)	70	95
(of which saturated fat)	(20)	(30)
Fibre (g)	24	24
Salt (g)	6	6

Ingredients for macaroni cheese recipes

Each dish serves four people.

Aunt Geena's favourite macaroni cheese

700 ml full-fat milk
1 onion
1 garlic clove
1 bay leaf
350 g macaroni
50 g butter
50 g plain flour
200 g cheddar cheese
5 g English mustard
50 g parmesan cheese
50 g white breadcrumbs

New recipe for macaroni cheese

350 g macaroni
225 g cheddar cheese
250 ml evaporated milk
2 eggs
fresh nutmeg
2 tomatoes

Nutritional information

'Trace' means less than 0.1 g per 100 g or 100 ml, which is insignificant.

Vegetables

All amounts given per 100 g

	Calories (kcal)	Protein (g)	Carbohydrate (g)	Fat (g)	Fibre (g)	Salt (g)
Garlic	98	7.9	16.3	0.6	4.1	Trace
Onion	36	1.2	7.9	0.2	1.4	Trace
Tomatoes	17	0.7	3.1	0.3	1.0	Trace

Butter and cheese

All amounts given per 100 g

	Calories (kcal)	Protein (g)	Carbohydrate (g)	Fat (g)	Fibre (g)	Salt (g)
Butter (slightly salted)	737	0.5	Trace	81.7	0	1.2
Cheddar cheese	412	25.5	0.1	34.4	0	1.8
Parmesan cheese	452	39.4	Trace	32.7	0	1.7

Milk

All amounts given per 100 ml

	Calories (kcal)	Protein (g)	Carbohydrate (g)	Fat (g)	Fibre (g)	Salt (g)
Full-fat milk	64	3.2	4.8	3.9	0	0.1
Evaporated milk	160	8.2	11.5	9.0	0	0.3

Other

All amounts given per 100 g

	Calories (kcal)	Protein (g)	Carbohydrate (g)	Fat (g)	Fibre (g)	Salt (g)
Bread (white)	235	8.4	49.3	1.9	4.5	1.1
Flour (plain)	341	9.4	77.7	1.3	3.1	Trace
Macaroni	270	9.4	54.8	1.1	2.0	Trace
English mustard	215	6.5	23.6	10.0	1.5	3.0
Eggs	147	12.5	Trace	10.8	0	0.2

Level 2 ●●●

19 Tiny Feet

Notes

Examples of lead-in questions

How many children attend the Tiny Feet nursery just now?

What is the maximum number of hours each member of the nursery staff works each day?

How many people work in the Woodpecker Room?

How many members of staff would you need for 20 five-year-olds?

Point to note

■ Planning tasks of this type can be set in a variety of vocational areas.

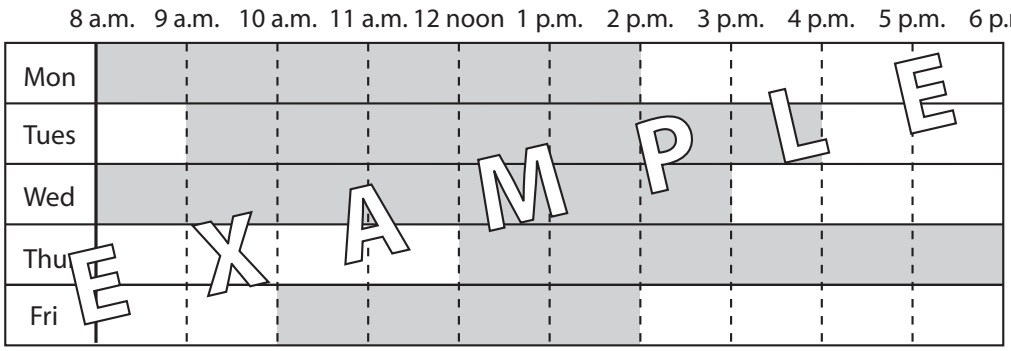
Level 2 ●●●

19 Tiny Feet

Task sheet (1 of 1)

You are one of the supervisors at the Tiny Feet nursery.
You work out the staffing rotas for the different rooms.
You give each member of staff a weekly individual timetable like this one.

Woodpecker Room – Kay



You are doing the rota for the Puffin Room.
You need to make sure that it is adequately staffed at any time without being over-staffed.

On Data sheet 1 there is information about the children attending and the staffing requirements.

Polly and Geri give you these notes.

I would like to be in the nursery about 35 hours a week if I can.

I am happy to come in early, as I need to get home for 3.45 pm each day.

Thanks.

Polly

I would like to leave work every day at 6 pm so I can pick my sister up from the shop where she works on my way home.

I don't mind when I start each day. Anything above 20 hours is good for me.

Geri

Working out timetables for Polly and Geri

A time planning sheet and individual staff timetables are on Data sheets 2 and 3.

- Work out a weekly timetable for each of them for the Puffin Room.
- How many hours will each of them work in a week?

19 Tiny Feet

Data sheet (1 of 3)

Tiny Feet Newsletter 2010

Happy new year!

We are looking forward to another wonderful year with your children at Tiny Feet.

We have three well-equipped rooms, the Puffin Room, the Blackbird Room and the Woodpecker Room.

We have a total of 27 children attending the nursery just now.

We have 8 nursery staff. Each of them works in one room so that they get to know your child and your child gets to know them.

Room	Age range (years)	Number of children	Staff
Puffin	Under two	5	Polly, Geri
Blackbird	Two	9	Lena, Pia, Wing-Yang
Woodpecker	Three to five	13	Kay, Jane, Penny

Jill and Katie also work at the nursery. They are qualified to work with all ages and allow the rest of the staff to take their breaks.

We are well-staffed and follow all health and safety guidelines. We open from 8 a.m. to 6 p.m. but no member of staff works for more than 7 hours each day.

Staff will take adequate breaks during their working hours but will stay in the nursery 'on call' for your child.

Child to staff ratios

The maximum child to staff ratios for different age groups in a day nursery are as follows.

children under two	3 : 1
two-year-olds	4 : 1
three- to seven-year-olds	8 : 1

The Puffin Room

Name	Age	Days attending	Times
Eve McKay	0 y 6 m	(M) (T) (W) T F	8 a.m. – 5 p.m.
Suneet Gupta	0 y 9 m	(M) (T) (W) (T) (F)	9 a.m. – 6 p.m.
Ruthie Jones	1 y 4 m	(M) (T) W T F	8 a.m. – 2 p.m.
Faith Phillips	1 y 5 m	(M) (T) (W) (T) (F)	11 a.m. – 3 p.m.
Josh Franklin	1 y 8 m	(M) (T) (W) (T) (F)	12 noon – 6 p.m.

Time planning sheet

Individual staff timetables

____

	8 a.m.	9 a.m.	10 a.m.	11 a.m.	12 noon	1 p.m.	2 p.m.	3 p.m.	4 p.m.	5 p.m.	6 p.m.
Mon											
Tues											
Wed											
Thurs											
Fri											

____

	8 a.m.	9 a.m.	10 a.m.	11 a.m.	12 noon	1 p.m.	2 p.m.	3 p.m.	4 p.m.	5 p.m.	6 p.m.
Mon											
Tues											
Wed											
Thurs											
Fri											

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	8 a.m.	9 a.m.	10 a.m.	11 a.m.	12 noon	1 p.m.	2 p.m.	3 p.m.	4 p.m.	5 p.m.	6 p.m.
Mon											
Tues											
Wed											
Thurs											
Fri											

Level 2 ●●●

20 French trip

Notes

Essential resources

calculators

Examples of lead-in questions

At this exchange rate which is more, €5 or £5?

You have €36.45.
What is the maximum you could change back to £s at Go Travel?
What would that give you in UK money?

How many euros could you buy for £100 at Go Travel?
How much change would you get?

Points to note

- There is potential for confusion about whether to multiply or divide by the given exchange rate. Some people find it helpful to begin by deciding which is the 'heavier' of the two currencies (in this case it would be the pound).
- Choosing and justifying the correct exchange rate is important in 'Coming home'.
- For similar work using up-to-date exchange rates, try searching on 'currency exchange rate'.

Level 2 ●●●

20 French trip

Task sheet (1 of 1)

On 30 July 2009, Kim and her friend Jane bought 600 euros in Go Travel to spend on a holiday in France.
They took Kim's car and used the Eurotunnel between Folkestone in the UK and Calais in France.

They are now in Calais on their way back home with 140.65 of the euros they bought.
They want to treat themselves to a special lunch before they go back.

Information about euros and lunch prices is on the data sheet.

Au Côte d'Argent

Kim and Jane stop at the restaurant 'Au Côte d'Argent' in Calais.
They both choose the menu douceur.
They drink tap water and have a coffee at the end that costs them €1 each.

- How much is the total bill in euros?
- How much did they pay for those euros in the UK?
- How many euros do they have left now?

Coming home

When they get home they are going to change as many of their euros as they can back to UK money.

Kim's petrol tank is nearly empty.
Filling it up will be about 47 litres of petrol.

The price of petrol in Folkestone in the UK is 102.9p per litre.
Where they are in Calais it costs €1.224 per litre.

- Do you think they should fill up the tank in Calais or Folkestone?

Explain your answer carefully.
State clearly any assumptions you make.

Level 2 ●●●

20 French trip

Data sheet (1 of 1)

Euro banknotes

Euro notes are identical across the euro area.
They are in €500, €200, €100, €50, €20, €10 and €5 denominations.
They can be used anywhere within the euro area, regardless of country of issue.
Each denomination has a different size and colour.
The values are printed in large figures to help the visually impaired recognise them.

Euro coins

The coins are in 1, 2, 5, 10, 20 and 50 euro cent denominators and
1 and 2 euro denominations.
They can be used anywhere within the euro area.
Each coin has the same front but may have different symbols on the back,
depending on where it was minted.

Go travel

30 July 2009

We only buy and sell euro **banknotes**.

We buy euros at €1.2526 for £1
We sell euros at €1.1156 for £1

Au Côte d'Argent

MENU DOUCEUR €18
service included

Home made fish soup
or
Fillet of herring with warm potatoes and vinaigrette
or
Home made paté with picalilli sauce

❧ ❧ ❧

Stuffed leg of guinea fowl with cabbage
or
Fillet of salmon with pasta, cream and chives

❧ ❧ ❧

Dessert trolley

MENU DÉLICE €25
service included

Seafood platter
or
Mussel soup with saffron
or
Burgundy snails with tomato sauce and candied fennel

❧ ❧ ❧

Fillet of cod and basil sauce
or
Fillet of salmon with mussels and green olives
or
Fillet of pork with stewed apple and spring cabbage

❧ ❧ ❧

Dessert trolley

Level 2 ●●●

21 Alcohol aware

Notes

Essential resources

calculators

Optional resources

water
measuring jug
drinking glasses
bottles

Examples of lead-in questions

How many millilitres of alcohol are there in a 750 ml bottle of wine labelled 10% vol?

How many units are there in 20 ml of alcohol?

How much alcohol is there in a 250 ml glass of wine that has an ABV of 10%?
How many units is this?

How many millilitres of whisky are there in two 25 ml measures?
For a whisky with an ABV of 40%, how many millilitres of alcohol are there in these two measures?
How many units is this?

Points to note

■ This is a good opportunity to apply mathematics to an important topic in personal, social and health education. It needs to be dealt with sensitively, taking account of the possible vulnerability of particular learners and any policy your school or college may have on how the topic is handled in the classroom. See the notes on page 10 about dealing with PSHE-related topics.

■ The Sally task uses the information worked out in the Cocktails task.

■ Many learners (and teachers!) might be surprised to see what 125 ml, 175 ml and 250 ml look like in a glass. Learners could find out how the definition of a 'standard' glass of wine has changed over the years. A standard glass of wine in a bar or pub was 125 ml for a long time but now a 175 ml glass tends to be considered standard and 250 ml large. Many drinkers are unaware that a large glass of wine is in fact one-third of a bottle.

■ Pubs have to display a sign saying whether they use a 25 ml or a 35 ml measure for gin, whisky, rum and vodka.

■ The term binge drinking is current but different definitions are used. Learners could find out about this and see whether Sally's alcohol consumption counts as binge drinking. The government advice was originally that women should not exceed 14 units, and men 21 units, per week. Daily limits were introduced to discourage binge drinking.

■ The unit centilitre (cl), equal to 10 ml or one-hundredth of a litre, may not be familiar. It is not needed for this task but learners may encounter it if they do further work on this topic.

■ The work could be adapted to include beer but beer is marketed in a wider range of quantities, including non-metric measures when sold on draught; also different beers vary greatly in strength, from about 3.5% to 6% ABV for most types, but with some special types having much higher concentrations of alcohol.

■ There is a great deal on the web about the medical and social effects of alcohol use (try searching on 'alcohol medical effects' and 'alcohol social effects').

Level 2 ●●●

21 Alcohol aware

Task sheet (1 of 1)

Information about alcohol content is on the data sheet.

Wine with friends

Mona, Jenny and Jake share a bottle of red wine with a meal.

This is part of its label. 

They each drink about the same.

▶ About how many units of alcohol did each of them drink with their meal?

Cocktails

Pete is mixing a cocktail called a Blue Hawaiian for himself and his girlfriend Sally.
He wants to know how many units of alcohol there are in the drink.

Here is the recipe he uses. It is for **one** drink.

Blue Hawaiian

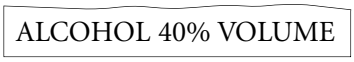
$1\frac{1}{2}$ measures white rum
$\frac{1}{2}$ measure dark rum
$\frac{1}{2}$ measure blue curaçao
3 measures pineapple juice
1 measure coconut cream

25 ml measures are used in this recipe.

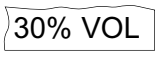
These are parts of the labels on the alcoholic ingredients.

White rum

Dark rum



Blue curaçao



▶ How many units of alcohol are there in one Blue Hawaiian?

Sally

Sally keeps a diary of how much she drinks one week.

This is a typical week for Sally.

▶ Do you think she is drinking in a way that might damage her health?
Show clearly how you made your decision.

Monday	*Nothing*
Tuesday	*1 × 175 ml glass white wine (11.5%)*
Wednesday	*Nothing*
Thursday	*Nothing*
Friday	*2 × 275 ml bottles of Smirnoff Ice (4.0%)* *1 × 250 ml glass red wine (12%)*
Saturday	*1 Blue Hawaiian cocktail (ask Pete)* *$\frac{1}{2}$ bottle of white wine (11.5%)*
Sunday	*1 vodka and lime (one 25 ml measure, 40%)* *2 × 275 ml bottles of WKD Vodka Blue (4.5%)* *1 × 175 ml glass red wine (12.5%)*

Level 2 ●●●

21 Alcohol aware

Data sheet (1 of 1)

Many people enjoy drinks that contain alcohol though some people do not drink alcohol for a variety of reasons.

Alcohol (also called ethanol) is a legal drug in the UK but, like most legal drugs, it will harm your health if you consume too much of it.

In a pub or bar,

- beer is usually sold in pints, half-pints, bottles or cans
- wine is usually sold by the glass: 125 ml, 175 ml or 250 ml; a full bottle of wine holds 750 ml
- spirits such as vodka or whisky are sold by the measure; a measure can be 25 ml or 35 ml

Bottles and cans are

- labelled to show how many millilitres (ml) or centilitres (cl) of drink they contain
- labelled to show the percentage of the drink that is alcohol; this is a standard measure of the alcoholic content of a drink and is called the alcohol by volume and (often abbreviated to abv or ABV)

The alcoholic content of a drink is often expressed in units. 1 unit = 10 ml of alcohol

These are the current government guidelines on how to drink to avoid damage to your health.

Men shouldn't regularly drink more than 3–4 units a day and women no more than 2–3 units a day.

'Regularly' means drinking every day or most days of the week.

Level 2 ●●●

22 Patio paving

Notes

Essential resources

calculators
squared paper

Optional resources

centimetre square dotty paper

Examples of lead-in questions

You have nine of the square 560 mm × 560 mm paving stones. You arrange them in a square. Sketch a diagram and work out the dimensions of the whole square, including the gaps between the stones.

What is the total cost of 5.88 square metres of sandstone paving stone?

What is the total area in square metres of 10 paving stones measuring 275 mm × 275 mm?

Points to note

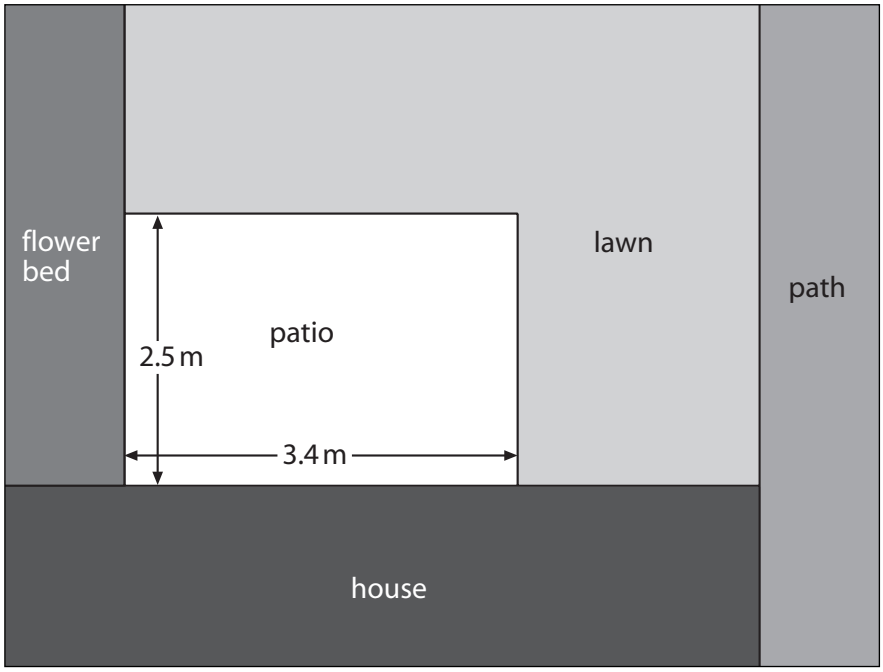
- Using centimetre square dotty paper helps learners to move away from a scale drawing (which complicates things unnecessarily) and to concentrate on a layout that follows the pattern and is about the right size.
- Some learners may wish to buy a few extra stones in case of breakage: it is common to do this when buying stones.

Level 2 ●●●

22 Patio paving

Task sheet (1 of 1)

Leanne wants a paved patio area at the back of her house.
This is her sketch showing the area she wants to pave.



The lengths are approximate.
She doesn't mind if the patio is a bit larger or smaller than shown on the sketch.

Leanne wants to buy sandstone paving stones and have them put down using Laying pattern 1 (on Data sheet 1).

The specifications and prices of stones are on Data sheet 2.

Planning and costing the patio

You run a small business laying patios.
Leanne hires you to lay her patio.

▶ Sketch a diagram to show how you can pave her patio using this design.
Your sketch should show the complete layout so you can count how many paving stones you need.
It should not be a scale drawing.
You do not need to show the gaps between the paving stones.

▶ Write a list of the sandstone paving stones you need to buy.
Include the size of the stones and the number you need.

▶ Work out the cost of these paving stones.

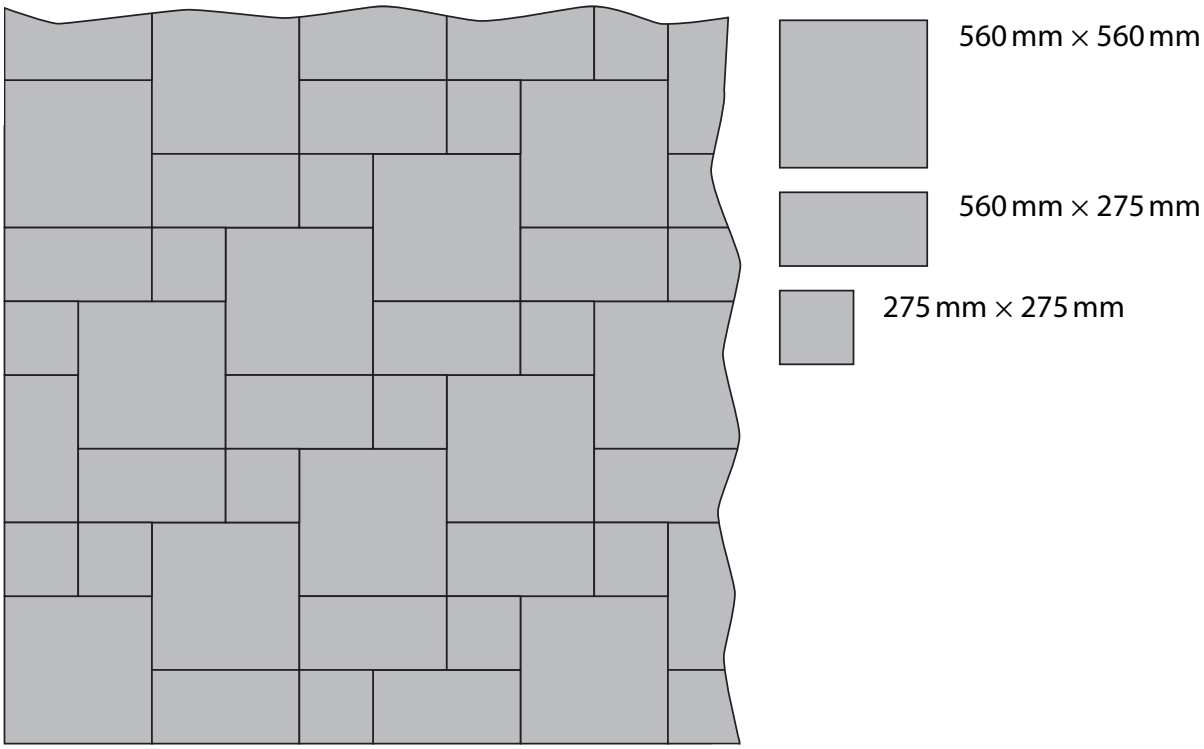
Level 2 ●●●

22 Patio paving

Data sheet (1 of 2)

Here is a laying pattern from a company that sells paving stones (sometimes called flags) for drives and patios.

Laying pattern 1: a design that uses three flag sizes



Sandstone paving stone details

Specifications

Sizes (mm)	Thickness (mm)
275 × 275	25–40
560 × 275	25–40
560 × 420	25–40
560 × 560	25–40
560 × 845	25–40
560 × 1130	25–40

Price

Total amount	Price per m^2
Under 20 m^2	£30.00
20 m^2 to 50 m^2	£29.00
50 m^2 to 100 m^2	£28.00
100 m^2 to 200 m^2	£25.00
200 m^2 to 300 m^2	£16.00
300 m^2 and above	£14.00

Gaps

A gap of about 10 mm is left between the paving stones.
This is filled in with sand and sealed.

This is a rule for converting area in mm^2 to area in m^2.

Area in m^2 = area in mm^2 ÷ 1 000 000

Level 2 ●●●

23 Pulse rate

Notes

Essential resources

calculators

Optional resources

access to a spreadsheet package

Examples of lead-in questions

How many male students took part in the experiment?

How many of the female students were over 20?

How many of the male students weighed less than 70 kg?

How many smokers took part in the experiment?

Points to note

- As of September 2009 a description of the full experiment could be found at www.statsci.org/data/oz/ms212.html.
This gives all the data, including the pulse rates before and after running and the pulse rates of the students who sat still. The task could be adapted to focus on the pulse rates after running rather than the rise in pulse rate.
- The scatter diagram facility on a spreadsheet package could be used to explore some of the data.
- Learners could suggest improvements to the experiment and carry out what they propose, preferably with a significant number of participants.
- Experiments of this kind are relevant to health and social care and sports studies.

Level 2 ●●●

23 Pulse rate

Task sheet (1 of 1)

Students in a statistics class at the University of Queensland took part in an experiment.

The students took their own pulse rate.
Some then ran on the spot for one minute while others sat still (it was decided at random who did which).
Then they all took their own pulse rates again.

They also provided data on their weight, smoking, drinking and exercise.

Joe wants to see if there is a link between the amount of exercise taken by the students generally and how much their pulse rates went up.

He collects together the data on the people who ran on the spot.
He divides them into six groups based on their gender and how much exercise they take.
This is on Data sheets 1 and 2.

Exploring the data

- Does this data tell you anything?

Explain your conclusions clearly.

23 Pulse rate

Data sheet (1 of 2)

Male students

Group ML male/low exercise

Weight (kg)	Age (years)	Smoker?	Regular drinker?	Rise in pulse rate
74	22	No	Yes	63
90	18	No	No	60
53	20	No	No	64
78.5	19	No	Yes	46
96	19	No	Yes	54

Group MM male/moderate exercise

Weight (kg)	Age (years)	Smoker?	Regular drinker?	Rise in pulse rate
60	23	No	Yes	62
70	18	No	Yes	66
60	19	No	Yes	90
75	20	No	Yes	33
85	19	Yes	Yes	57
65	19	No	Yes	44
75	20	No	Yes	17
98	19	No	Yes	74
80	20	No	Yes	10
95	18	No	Yes	56
65	20	No	No	56
80	20	No	No	92

Group MH male/high exercise

Weight (kg)	Age (years)	Smoker?	Regular drinker?	Rise in pulse rate
75	20	No	Yes	12
63	20	No	Yes	54
70	20	No	Yes	62
87	20	No	Yes	40
87	23	No	Yes	34
78	19	No	Yes	68

Female students

Group FL female/low exercise

Weight (kg)	Age (years)	Smoker?	Regular drinker?	Rise in pulse rate
50	34	No	No	28
66	23	No	No	94
60	19	No	Yes	23
50	19	No	Yes	56
42	22	No	No	45
51	18	No	Yes	50
60	19	Yes	Yes	32
63	20	No	Yes	28
47	23	Yes	Yes	54

Group FM female/moderate exercise

Weight (kg)	Age (years)	Smoker?	Regular drinker?	Rise in pulse rate
58	19	No	Yes	68
74	18	No	No	26
56	21	No	Yes	64
57	19	No	No	55
55	20	No	No	49
41	20	No	No	25
51	18	No	No	16
77	18	No	No	89
57	20	No	Yes	43
59	18	No	Yes	51
50	19	No	Yes	70
78	28	No	No	56

Group FH female/high exercise

Weight (kg)	Age (years)	Smoker?	Regular drinker?	Rise in pulse rate
62	18	No	Yes	80

Level 2 ●●●

24 Patchwork

Notes

Essential resources

graph paper
coloured pencils
calculators
rulers

Examples of lead-in questions

Look at the central square in the repeating block. How many of these will you need for the whole baby quilt?

If a square patchwork piece (part of another quilt) measured 12 cm by 12 cm what size of piece would you need to **cut out**?
How many of these pieces would fit along the width of a piece of fabric from Custom Quilters?

Points to note

■ Finding the dimensions needed to cut the triangular pieces is tricky. Graph paper can be used to draw out a full size piece with its seam allowance and then appropriate measurements taken; this is what most quilters would do in practice.

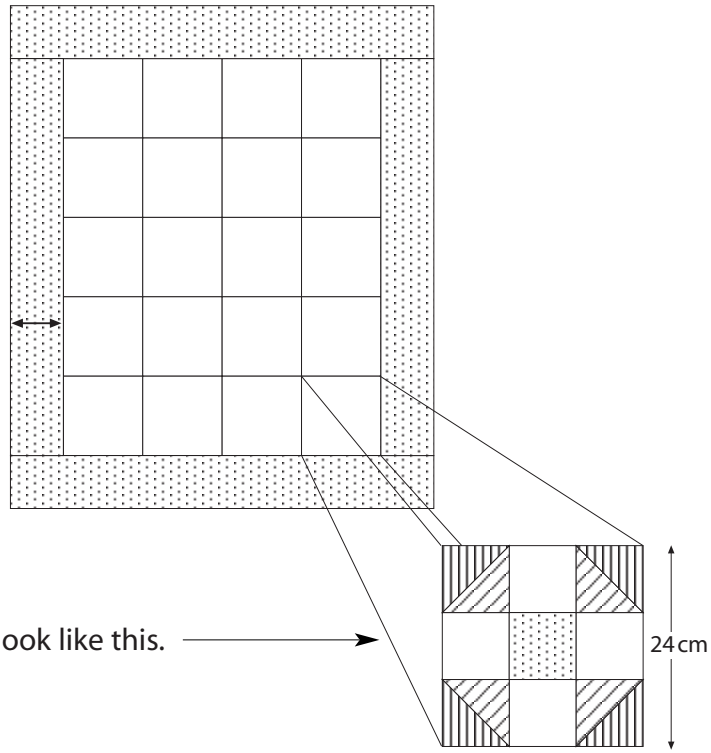
24 Patchwork

Task sheet (1 of 1)

To: Custom Quilters

I would like a baby quilt made for my grandchild who is due in five months.
I would like the front to have repeating square blocks like this.

I would like the width of the border to be 15 cm.



I would like the repeating block to look like this.

I would like the border to be the same fabric as the central square in the block.
The back can be made from any plain matching fabric.
The choice of fabric is up to you but I would like the overall look to be very fresh.
It should be suitable for a boy or a girl.

Hope you can do it in time!

Yours,

Gail Glover

Planning the design

- Plan the design for the front of the quilt for Gail Glover.
- Work out the length of each type of fabric needed.

All the Custom Quilters fabrics are 112 cm wide.

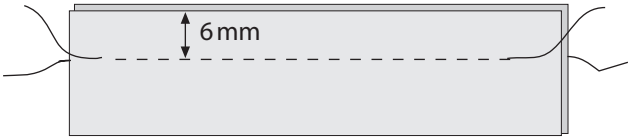
Follow the information and planning guidelines on Data sheet 1, and show all your working carefully so it can be checked before the fabric is cut.

24 Patchwork

Data sheet (1 of 1)

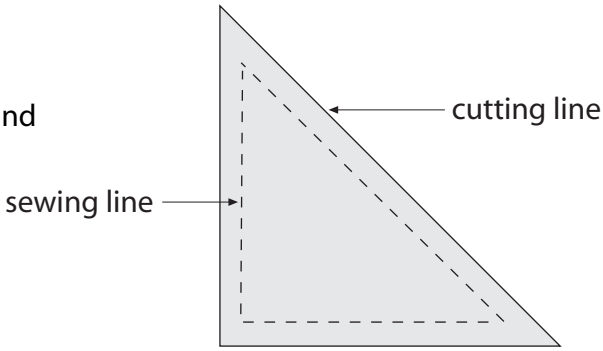
Seam allowances

Two patchwork pieces are joined by sewing a seam 6 mm from the edges.



For example, this patchwork piece is in the shape of a right-angled triangle.

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



Block designs

A **block** is a single design unit.
Blocks can be sewn together to create a quilt or smaller item.
A quilt is usually edged with a frame of fabric called a **border**.
In a block design, the same material should be used for pieces that are shaded the same way.

Custom Quilters: planning guidelines for a block quilt design with a border

- Write down the size of the block and the width of the border.
- Draw out the entire quilt on graph paper, including borders. Show all the patchwork pieces on your sketch.
- Colour all the pieces in the design with different coloured pencils or crayons to indicate the different fabrics that will be used.
- Make a list of the total number of pieces of each type you need.
- Work out the size of each type of piece to be cut. Remember the seam allowance of 6 mm.
- Determine the length of each type of fabric you need for the pieces.

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OCR customer contact centre

Vocational qualifications
Telephone 024 76 851509
Facsimile 024 76 851633
Email vocational.qualifications@ocr.org.uk

General qualifications
Telephone 01223 553998
Facsimile 01223 552627
Email general.qualifications@ocr.org.uk

OCR
1 Hills Road, Cambridge CB1 2EU
Telephone 01223 552552
Facsimile 01223 553377

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