

Preparation

Introduction to Module 2

Measurement is an important aspect of the painting and decorating industry. All trainees should understand metric units and be able to measure within a given level of accuracy. Learners will need to make accurate calculations in order to work out quantities of material and the time required to do the job. They should also understand why the accuracy required may vary from one situation to another.

Painters who work within larger organisations will be working from given job specifications and must be able to interpret this information accurately.

This module gives learners the opportunity to develop a range of skills required for preparation, including:

- reading job specifications
- understanding metric measures
- understanding the level of accuracy required
- working out perimeter and area
- estimating materials for painting and papering
- diluting materials.

The skills in this module can be applied to many situations, depending on the work settings of learners. It includes some work on wallpaper which may not be appropriate to all trainees. This should only be used if relevant. The Word version of the materials may be used to change the measurements given and to give more practice.

Painting operations – Module 2: Preparation					
Theme	Page reference	NOS/NVQ	Literacy	Numeracy	Key Skills
Working from a job specification	Pa 2:1–2:3	VR330; VR331; VR332; VR333	Rt/L2.3; Rt/L2.7; Rs/L2.2; Rw/L2.1		C2.2
Measurement	Pa 2:4–2:5	VR336		MSS1/E3.8	
Perimeter	Pa 2:6–2:7	VR336; VR338		MSS1/L1.8	N1.2
Area	Pa 2:8–2:10	VR331; VR333; VR336		MSS1/L1.9	N1.2; N1.3
Estimating materials for painting	Pa 2:11–2:12	VR331; VR333		N1/E3.4; N1/E3.6	
Estimating materials for wall and ceiling covering	Pa 2:13–2:14	VR336		HD1/L1.1	N2.1
Working out the cost of materials	Pa 2:15–2:16	VR02; VR331; VR332; VR333; VR336		N1/E3.8; N2/E3.4	
Diluting materials for priming	Pa 2:17–2:18	VR330; VR332		N1/L1.7	

Skills checklist

In painting operations, preparing for the job is most important. This may include sizing up the job, estimating and costing materials or working from a job specification.

- Measuring and estimating materials properly will mean less waste and more profit.
- Following specifications correctly will mean that you get the job done efficiently and the customer gets what they want.

What you need to do before you start a job will depend on whether you are employed by a contractor or work as an independent decorator.



The skills listed in the table below will help you to measure up and calculate the size of a job. You can then make a good estimate of the materials and time you need for a job. Tick the skills you feel confident about now. Complete the activities in this module to help you improve on the skills you have not ticked. Return to the list later to check any areas where you still need some practice.

Skills for preparation	Now	Later
Working from a job specification		
Using metric measures to size up a job		
Working out the perimeter or area of a room		
Estimating paint for a job		
Estimating wall and ceiling covering for a job		
Diluting materials		

PAGES 2:1–2:3

Working from a job specification

Occupational setting

It is vital that operatives understand the specific requirements of a job and their own responsibilities in terms of quality and finish. In most settings, operatives will be working from the verbal instructions of a team leader or supervisor; however, there may be situations in which they need to check job specifications. Alternatively, learners may wish to develop skills in order to become a team leader. Job specifications come in a wide range of formats and can be very complex. It requires skill to navigate them and to extract information from them. This theme offers some tactics for this level of detailed reading.

Materials

Job specifications from the learners' workplace

Job specification from the Source material
(0:13–0:14)

Learning outcomes

- 1 To use format to navigate a text (focus page, Task 1)
- 2 To use different reading strategies to find and obtain information from a text (focus page, Task 1)

Suggested teaching activities

Introduction

- Explore learners' experience of job specifications. Show examples. Ensure all learners are aware of the full word 'specification' and its shortened version, 'spec.', and discuss the meaning of this word. *How important is it to understand the job specification? What sort of information would you expect to find on a specification? What could go wrong if it isn't understood? What are your responsibilities?*
- Make sure learners are aware that specifications describe both quality and quantity.
- Confirm that although it is usually the site/team supervisor who interprets the job specification, it is important that all operatives know how to read them.

Focus pages

- Go through the points on the focus pages, expanding on any queries raised by learners. Note that some of the skills are practised elsewhere. Make sure learners understand and use the following techniques.
 - Using headings, subheadings and format to locate information – these are useful signposts in text, to help you locate what you want to read.
 - Searching the text for key words (scanning) – first decide what key word to look for (depends on what your purpose is) and then look quickly through the text, in the same way as you look for a friend in a crowd.
 - Reading to get the gist (skimming) – this is a quick look through text to get a general idea of what it is about, not detailed reading. For effective skimming some learners may need to be given clues. Look at the appearance of the text: the layout and font styles. Look also for words that stand out, which give clues about the content.
- Detailed, careful reading is needed in order to work out meaning (i.e. comprehension):
 - Look at the use of punctuation to assist understanding:
 - Full stops indicate a natural pause or break in the meaning of text.
 - Commas separate items on a list.
 - Brackets contain extra (supplementary) information.
 - Colons indicate that what follows it is an explanation or extension of what has gone before (i.e. more specific information).
 - Dashes are sometimes used instead of brackets or commas, to separate ideas or information.
 - Asterisks or numbers are used to refer to additional information elsewhere in the text.

- Find out the meaning of technical vocabulary:
 - Glossary – use the technical glossary in these materials or a trade-specific glossary.
 - Dictionary – most useful for non-technical words.
 - Using context – an educated guess, based on the other words around the vocabulary or other clues, such as graphics.
 - Asking colleagues or experts – point out the advantages and disadvantages of using this as a way of confirming meaning (you have to be sure the person you're asking knows what he/she is talking about).
 - Keeping a personal glossary – particularly useful for dyslexic and ESOL learners, but a good strategy for all.

- Abbreviations may include such as things as BS (British Standard) or NBS (National Building Specification). Strategies for finding out meanings and remembering them are the same as for technical vocabulary. Point out some of the difficulties around guessing the meanings of abbreviations (sometimes an abbreviation can have more than one meaning). Use card-matching activities to support learners and help them remember abbreviations.
- Photocopy and enlarge two copies of the sentence about Preparation from the job specification at the bottom of the second focus page. It includes technical language and uses a range of punctuation. Put one copy of the whole sentence on the board. Cut the other into chunks (single words or phrases) and use these to exemplify the techniques suggested on the page. *Does the sentence still make sense without the information in the brackets? Can 'crumbling' be put in the place of 'friable'? How many things are on the list of things to do?*
- Give learners a copy of the Job specification from the Source material. Go through it, identifying and, if appropriate, highlighting examples of each of the points mentioned above.
- Ensure learners understand the technical vocabulary used in the job specification – flattening process, skidding, sagging, feather, distressed – as well as other difficult vocabulary – randomly, representative, internal angles, adjacent.

- In pairs or small groups, ask learners each to read a small section of the specification and explain it in their own words to a colleague.

Curric. refs	NOS/NVQ	Key Skills
Rt/L2.3	VR330	C2.2
Rt/L2.7	VR331	
Rs/L2.2	VR332	
Rw/L2.1	VR333	

Task 1

Read a job specification to answer questions

Rt/L2.3

Rt/L2.7

Rs/L2.2

Rw/L2.1

- Ensure learners have a copy of the Job specification from the Source material. Highlighting is used on the task page to help learners identify subheadings and key words that will be useful in answering the questions.
- Understanding of formatting, punctuation and use of the glossary will be needed.

If the learner has difficulty

- Work with the learner on questions that are causing difficulty. Remind them to use the subheadings to locate the correct part of the job specification. Remind them that the key words highlighted will help to answer the questions.
- Help learners with any vocabulary that is difficult, such as 'adhering' and 'inhalation'.
- Learners who are unsure about punctuation and its impact on meaning may need additional support using *Skills for Life* materials.

Extension

Set some further questions based on this job specification. It might be useful for learners to develop a quiz, each person writing one question using the same sort of format as the questions on the task page.

Theme assessment

Using the skills developed here, learners should read a job specification from their workplace and be prepared to present a summary of the requirements to colleagues. This could be done as a formal presentation if appropriate.

Working from a job specification

Focus

If your boss is off work, you may have to read the job specification to make sure you are doing the right thing.

The **heading** tells you what the job specification is for.

Use the heading to check you have the right specification.

There is a **summary** of what needs to be done. This one is a **table**.

Use the summary to get the gist of what you have to do.

Each **subheading** stands out. It tells you what that part of the specification is about.

You may not need to read the whole specification. Just search for the subheading you need and then read that part in more detail.

* If you see an asterisk or a number, you may have to look somewhere else for more information.

Scan the page for a matching symbol or number and then read the extra information. The extra information might be on another page.

Plaster 1

Substrate:

- To include walls previously Twincoat and borders
- To be Twincoat and borders

Exposure:	Internal	Finish coating type:	Water-based
Substrate:	Plaster	Data sheet:	416 (417)
Severity of exposure:	Moderate	Sheen level:	Variable
Condition of surface:	Light failure	Job no:	D26
Previous coating:	Water-based painted		
Required finish coat:	Coverall Trade Twincoat with Transcoat		

down sound areas to produce the necessary 'key' for good adhesion and 'feather' broken edges of existing coatings. *Dust off.

Note

*When rubbing down dry and/or dusting off wear a suitable face mask to avoid the inhalation of dust. (See Trade Paints Site Work Instructions (103401214) v1 Clause C40IJ for further information)

Priming

Coverall Trade Twincoat Top will draw any current or previous stains through the coating film, even if not apparent at the time of decorating.

To seal all marks or suspect areas and surfaces that remain powdery and friable after thorough preparation, apply one coat of **Coverall Trade Stain Block**.

Prime all sound bare areas and areas exposed by the removal of coatings with: One coat of **Coverall Trade Twincoat First** of appropriate shade thinned up to 1 part water to 5 parts of product as appropriate.

Making Good

Cut out and make good cracks, holes and other imperfections with a **Trade filler** appropriate to the surface and according to the manufacturer's instructions. Allow such making good to dry out thoroughly before being sand papered smooth and *dusted off.

Fillers

Use only good quality/compatible materials and follow the manufacturer's recommendations for use, even if at variance with this system.

Note

*When rubbing down dry and/or dusting off wear a suitable face mask to avoid the inhalation of dust. (See Trade Paints Site Work Instructions (103401215) v1 Clause C40IJ for further information)

Cont'd

PLEASE NOTE THE FOLLOWING IMPORTANT GUIDELINES:

- These guidelines are for Professional use only.
- This system is suitable for Plaster, Render, Block, Approved Brick and Concrete as detailed above.
- This document must be read in conjunction with the hard copy of Site Work Instructions (103401215) which gives essential guidance to good painting practices.
- Care and attention must be employed when using the systems. The relevant British Code of Practice must also be complied with.
- Comply at all times with BS 6150:1991 Code of Practice for Painting of Buildings (or as amended).

Preparation

Thoroughly clean down the surfaces to remove all dirt, grease and surface contaminants.

Carefully scrape back to a firm edge all areas of poorly adhering or defective coatings. Powdery and friable surface coatings (such as soft distempers etc.) should be completely removed by scraping, brushing and washing. Allow the surface to fully dry before proceeding. Where appropriate, rub

Working from a job specification

Focus

Finishing System

Two coats of **Coverall Trade Twincoat First** of appropriate shade. (It is essential that the surface to be treated is sealed by the Twincoat First.)

One coat of **Coverall Trade Twincoat Top** of selected shade.

One coat of **Coverall Trade Transcoat**. (Matt or Satin)

Application Guidance

Apply the Coverall Twincoat Top around the edges of one wall only, window frames radiators etc. Stipple out any brush marks using the tips of the brush. Next apply the Coverall Twincoat Top to the remainder of the wall using a medium pile roller. This must be applied evenly and generously. Over-rolling will give poor results when distressed.

Do not apply to an area larger than can be distressed in 10–15 minutes. Larger flanks will require application and distressing in stages to avoid losing the working edge. After approximately 2 minutes, test a small representative area using the primed Coverall Twincoat Roller. If the film can be distressed without skidding or sagging then the surface is ready to be distressed overall. If a longer time period is required (depending upon the room temperature/humidity) re-apply the Coverall Twincoat Top to the test area and wait a further 2 minutes. Any build of Coverall Twincoat Top in internal angles can be removed using a small dry fitch. When the surface is ready to be distressed, work quickly and systematically.

Coverall Twincoat Classic Roller: Work randomly, avoiding vertical and horizontal strokes.

Coverall Twincoat Nouveau Roller: It will be necessary to even up the pattern by laying off gently with vertical strokes.

Any Coverall Twincoat Top that is deposited on adjacent surfaces, tops of skirtings etc, can be wiped off using a damp sponge.

The application of Coverall Trade Transcoat provides added protection.

Standard	Site Work Instructions (103401215)
C40IJ	Rubbing Down & Dusting Off When rubbing down use a wet flattening process. Where it is not possible or practical to use a wet process, wear a suitable face mask when rubbing down dry and/or dusting off to avoid the inhalation of dust. When it is known or suspected that coatings contain lead refer to Clause C40IT for further information.

Standard	Site Work Instructions (103401215)
C40IT	Lead in Previous Coatings All Dulux and Glidden paints are free from any added lead. However, the wood and metal surfaces of the building, especially if it is pre-1960, may have been decorated in the past with a paint made with lead pigments. Preparation and removal of such paint can be hazardous. For a free leaflet explaining how the surface should be prepared safely contact: Paints Technical Group: Coverall Paints, Station Road, Industrial Estate, Aveshire, AV6 3ST. Tel: 01142 517369

Some things are written in *italics* or **bold**, or are underlined, to draw your attention.

You can use these as key words or phrases as you search the page.

When you find the part you think you need, read it quickly to get the gist.

If the information is complicated, read it again in more detail.

- Find out the meaning of any technical words.
- Find out the meaning of any abbreviations.
- Use the punctuation to help.
- Read the text in small chunks.
- Read it more than once.
- Read it aloud.
- Think about it in your own words.

What is this comma for?
What are these brackets for?

What does friable mean?
What is etc short for?

Preparation

Powdery and **friable** surface coatings [such as soft distempers etc.] should be completely removed by scraping, brushing and washing.

So that means that when I'm getting ready to paint I've got to scrape, brush and wash any areas where the surface is powdery or crumbling.

Working from a job specification

Task

Task 1

Use the Job specification from the Source material to answer the following questions.

- 1 During **preparation** you must rub down the sand areas to produce the necessary **'key'**. What does 'key' mean here? Tick your answer.

- a a tool for opening a door
- b an explanation of a map
- c roughness on a surface

- 2 When you are **priming**, the product should be **thinned**. How many parts of solvent to parts of product should you use?

- 3 When you are **making good** you have to rub down any filler when it is dry and dust it off. What clause should you read if you want more information about rubbing down?

- 4 The application guide tells you that the drying time may vary. **What two things** does this **depend** on?

- 5 The **application guide** also says:

Coverall Twincoat Nouveau Roller: It will be necessary to even up the pattern by laying off gently with vertical strokes.

Explain the above to a friend, using actions if necessary!

Tip

To find the answers quickly:

- find the right section by using the **subheadings**
- scan the section for a **key word**
- read the section in detail to find the answer.



PAGES 2:4–2:5

Measurement

Occupational setting

Measuring is used for a range of different painting and decorating activities, such as estimating quantities and costs, cutting materials to a rough size (to be trimmed to fit in situ), cutting materials to an exact size (to fit accurately). The purpose of the measurement dictates the units of measure used (e.g. millimetres or metres) and the level of accuracy required. In this theme it is assumed that learners have achieved a basic level of competence with metric measures and can measure in millimetres and metres. They should be able to convert millimetres to metres and vice versa, and record measurements in decimal format. It may be necessary to recap on these skills – *Skills for construction* Module 3 can be used for this purpose.

Materials

Measuring tapes and rulers

Learning outcomes

- 1 To choose appropriate units for different measuring tasks (focus page, Task 1)
- 2 To know when measurements need to be accurate and when they can be rounded (focus page, Task 1)

Suggested teaching activities

Introduction

- Recap on measuring skills to ensure that learners can:
 - measure in millimetres and metres
 - convert from mm to metres (and vice versa)
 - record measurements in decimal format
 - Use practical activities to check the skills are secure.
 - If learners are having difficulty, you can use materials from *Skills for construction* Module 3 or *Skills for Life* Entry 3 Unit 4.
- Practical activities that involve measuring rooms, doors, windows, etc. are the most effective way to teach and practise measuring length.
 - As part of the introduction to this theme it will be useful to look at rounding in measurement. Whilst completing practical measuring tasks, ask learners to find the nearest whole metre, centimetre or 10 mm mark. Encourage them to round up not down. Discuss why this is important. Talk about the markings on the tapes and show learners how markings show significant points on the scale, such as whole metres, half metres, 10 cm, etc.
 - Note: centimetres are not generally used in painting and decorating; however, tapes and rules will identify these units. It is worth spending some time talking about this and dealing with any issues that arise.
 - Be aware of the wide variety of tapes and rulers available and take this into account when teaching measures.

Focus page

- Ask learners to identify the measuring activities they carry out or have seen colleagues carry out in their own workplace setting. List these on the board/flipchart as the first column in a table. For each of these measuring activities, identify the reason or purpose for measuring. This may be to estimate materials or to cut materials to size.
- Discuss the level of accuracy required in each case. Ask questions to focus learners' attention on key issues.
 - *If I'm working out how much paint I need, do I need to measure the wall to the nearest millimetre? How will I record these measurements? How is the coverage for paint and other wall coverings given?* This is usually in square metres so there is no need to work out the area down to the last square millimetre.

- *If I'm cutting a piece of coving to fit a wall, how accurate do I need to be? Will it be OK to measure this to the nearest metre or even half a metre?* Measuring for fit requires a high degree of accuracy.
- *If I'm hanging wallpaper, should I cut this exactly to size or do I allow a bit extra and then trim it to fit?*
- Emphasise with learners the different levels of accuracy needed for different purposes. This can also be recorded on the board/flipchart next to the jobs identified earlier, together with the units of measure that they would use to record their measurements. Learners can grade these jobs according to the level of accuracy required in the measurements.
- Go through the examples on the page and ask learners to complete the task.
- Note: there are many language issues here that may present barriers to learners. Make sure terms such as 'rounding', 'estimating' and 'accuracy' are all understood. Give everyday examples to demonstrate this and ask learners to contribute their own.

Curric. refs	NOS/NVQ	Key Skills
MSS1/E3.8	VR336	N/A

Task 1

Identify the units of measure and level of accuracy appropriate to a range of job-related tasks

MSS1/E3.8

- Recap on the main message of the focus page – that the level of accuracy required reflects the purpose of the task.
- Ask learners to think about each job described and to consider which units of measurement would be appropriate and the level of accuracy that is needed. Remind learners of the table made during the focus activities.
- Work through the first task together to ensure learners are confident with the format of the task.

If the learner has difficulty

- Identify the source of difficulty. It may be that the learner is not competent at measuring length or doesn't understand the units of measure. Learners who lack confidence with measurement need lots of practical activities – with support – to gain confidence with this critical skill.
- Learners may be struggling with the concept of levels of accuracy and may require more support. Relate this to everyday life situations such as cooking using a recipe, or timing to get to an appointment on time. Sometimes you have to be spot on whereas other times you can be more flexible.
- Some learners will need help understanding and interpreting the vocational context. Working in pairs will increase the range of experience.
- Learners having difficulty with place value and recording decimals may be supported by recording numbers into a table that clearly identifies place value around the decimal point.

Extension

Carry out the measuring tasks described to the level of accuracy required.

Theme assessment

- Ask learners to measure up a room for materials. Check their measurements and recording before moving on to area and perimeter.
- Observe learners in the workplace when completing tasks requiring measurement.

Measurement

Focus

Measurements are used for different purposes in painting and decorating. The **purpose** of a measurement affects:

- the **units** you use when you take the measurement (e.g. **metres** or **millimetres**)
- how **accurate** your measurement needs to be.

Here are some examples.



Measuring rooms to estimate quantities and costs

Metres are the most useful units because the coverage of most coating materials is given in **square metres**.

It is usual to **round up** to the next **0.25 metre**, e.g.:

1.15 m will round up to 1.25 m

3.45 m will round up to 3.50 m

Remember!

It's better to have too much material than too little.

Measuring mouldings for cutting and fitting

- **Millimetres** are the most useful units for cutting mouldings such as coving or dado rails to an exact size.
- Measure to the **nearest millimetre** to ensure a precise fit.

Remember!

Measure twice. Cut once.

Measuring paper for hanging

- Both **metres** and **millimetres** are useful.
- Measure the paper to the required length and **add on an extra 100 mm** to allow for trimming.

Remember!

It is better to cut the paper a bit longer than necessary than to cut it too short!

Try this

Think of a decorating job you have done that involved taking some measurements.

Copy and complete the table.

What was measured	The purpose of the measurement	Units used

Remember!

- There are 1000 millimetres in 1 metre.
- Divide by 1000 to convert from millimetres to metres, e.g.:
 $1150 \text{ mm} = 1.15 \text{ m}$
 $2356 \text{ mm} = 2.356 \text{ m}$
 $250 \text{ mm} = 0.25 \text{ m}$

Measurement

Task

Task 1

Read the description of each measuring task and complete the table below. Tick the **unit of measurement** you would use. Tick how **accurate** your measurements would need to be.

Tip

Think about the purpose of the measurements.

- 1 Measure a **wall** to mark out the correct height for a dado rail.



Unit	✓	Level of accuracy	✓
millimetres		very accurate measurement	
metres		rounded up measurement	

- 2 Measure a **wall** to calculate how many tins of paint you need.



Unit	✓	Level of accuracy	✓
millimetres		very accurate measurement	
metres		rounded up measurement	

- 3 Measure a **ceiling** to calculate how much paper you need.



Unit	✓	Level of accuracy	✓
millimetres		very accurate measurement	
metres		rounded up measurement	

- 4 Measure a **chimney breast** in order to centre some repeat-pattern wallpaper.



Unit	✓	Level of accuracy	✓
millimetres		very accurate measurement	
metres		rounded up measurement	

PAGES 2:6–2:7

Perimeter

Occupational setting

Perimeter is important for calculating materials and labour costs for certain decorating jobs. This applies particularly to wallpaper and borders. Learners working for small contractors and sole operators are more likely to be involved in taking measurements and calculating perimeters than those working for large contractors who have quantity surveyors to do this task. All apprentices, however, should be able to measure up a space and calculate materials accurately.

Materials

Measuring tapes

Plans from the workplace

Learning outcomes

- 1 To know that the perimeter of a room is the total distance around it (focus page, Task 1)
- 2 To know the measurements required to calculate the perimeter of a room (focus page, Task 1)
- 3 To find the perimeter of rectangular and irregular-shaped rooms (focus page, Task 1)

Suggested teaching activities

Introduction

- Introduce the term 'perimeter'. *What does this measure? How is it different to area?*
- Discuss why learners might need to measure perimeter. (Each job requires materials and labour. Perimeter measures are used to calculate materials.) How do they measure perimeter? (tapes, using measures already given on plans, estimating) This is a useful opportunity to discuss the degree of accuracy needed.
- Discuss jobs that involve painting or fixing materials that go all the way around the edge of a room in a continuous 'strip' (e.g. painting the coving, etc.) *How long does it take to paint 1 metre of coving or skirting board? How about 10 metres? How much coving/skirting do they think they can paint in 1 day?*

Focus page

- Work through the examples and questions on the focus page. Check that learners understand the difference between 'internal' and 'external' measurements on a plan.
- You will need to discuss measures to be used. In this setting, it is most common to use whole metres, but you will need to discuss the range of measures learners may come across, including measures expressed as a fraction (4.25 m), in mm (900 mm) or mixed units (2 m 30 mm). These are usually dealt with by rounding up to the nearest whole metre. Give some examples of this, ideally using workplace plans.
- If appropriate, look at workplace plans to see how measures are recorded. It might be useful to discuss this in terms of levels of accuracy required by different trades.
- Discuss and involve learners in practical activities using different methods for measuring and then calculating the perimeter of a rectangular room, for example:
 - Measure all the way around the space.
 - Measure each wall and add the four measurements together. It is useful to work out a simple formula in words (e.g. wall 1, plus wall 2, plus wall 3, etc.).
 - Measure the longest and shortest walls. Add the two measurements together and double it. Ask learners to work out a simple formula in words (length + width \times 2). Ask for other calculation methods (e.g. double the length, double the width, add them together – $2 \times$ length + $2 \times$ width).
- Measure and calculate the perimeter of irregular-shaped rooms. This can be presented as a practical problem-solving activity that involves cutting up shapes into rectangles. Use the example of a room with a chimney breast as an initial demonstration of this.
- Ask learners to consider the 'Try this' on the page. As a group how many different methods have they used successfully? Which do learners find most effective?

- Note: language for maths is often a barrier to learning. Write up important words and definitions during the session and encourage learners to keep a glossary.

Curric. refs	NOS/NVQ	Key Skills
MSS1/L1.8	VR336 VR338	N1.2

Task 1

Work out the perimeter of regular and irregular-shaped rooms

MSS1/L1.8

Learners should start by looking at the plan and ensuring that they are clear about the three different areas. The measures for each area should be calculated first, then the perimeter.

If the learner has difficulty

- Reduce the load by asking the learner to focus on one room only. Some learners may benefit from cutting out the shapes to work on individually.
- Start with the regular-shaped rooms first. Check the learner understands the process (i.e. adding the measures for each side). Work on the canteen first.
- Ensure the learner is adding the measures for all sides of the shapes (i.e. they are not adding the same side twice, or omitting one side from the calculation). It may help to cross off each measure as it is counted. The sum for the sides should include the same number of measures as there are sides in the room (there may be more than four sides).
- If the learner has problems with addition, they will need support using *Skills for Life* materials.

Extension

- Additional practice could involve measures using fractions of a metre (e.g. 2.5 m), measures expressed in mm to be converted to metres, or measures expressed in mixed units (e.g. 2 m 45 mm).
- Learners could work out a formula for calculating perimeter to be applied to these shapes, then see what happens if one measure is omitted (e.g. $2a + 2b = P$ becomes $2a + 32 \text{ m} = 54 \text{ m}$. What is the measurement of wall a?)

Theme assessment

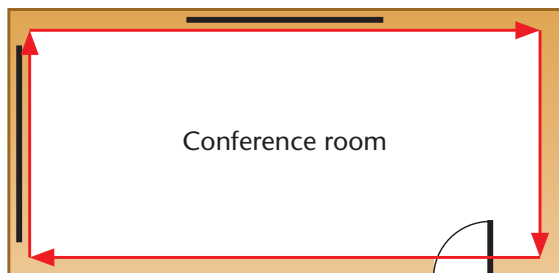
Using sets of workplace plans, learners should calculate the perimeter of a range of regular and irregular-shaped rooms, rounding measures where necessary.

Perimeter

Focus

Measuring perimeter is important for calculating materials and labour costs for certain decorating jobs.

Perimeter is the distance around a room.



Try this

Which **decorating jobs** involve painting or fixing materials around the **perimeter** of a room?

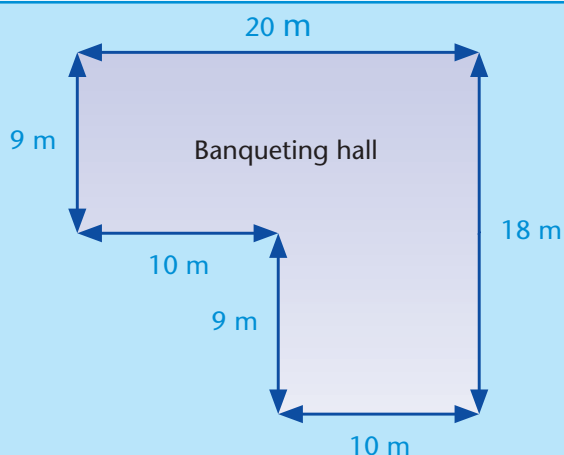
To calculate perimeter:

- Measure the length of each wall.
- Add the measurements together.

Example:

$$9 + 10 + 9 + 10 + 18 + 20 = 76$$

The **perimeter** of this banqueting hall is **76 metres**.



In **rectangular** rooms, the opposite sides are the same length. Here is a quick way to calculate the **perimeter** of a **rectangular** room.

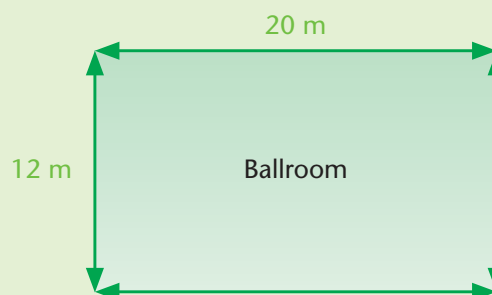
- Measure the length of the longest and the shortest walls.
- Add them together.
- Multiply your answer by 2.

Example:

$$12 + 20 = 32$$

$$32 \times 2 = 64$$

The **perimeter** of this ballroom is **64 metres**.



Remember!

Features such as chimney breasts will increase the perimeter.

Try this

Think of another way to calculate the perimeter of the ballroom.

Perimeter

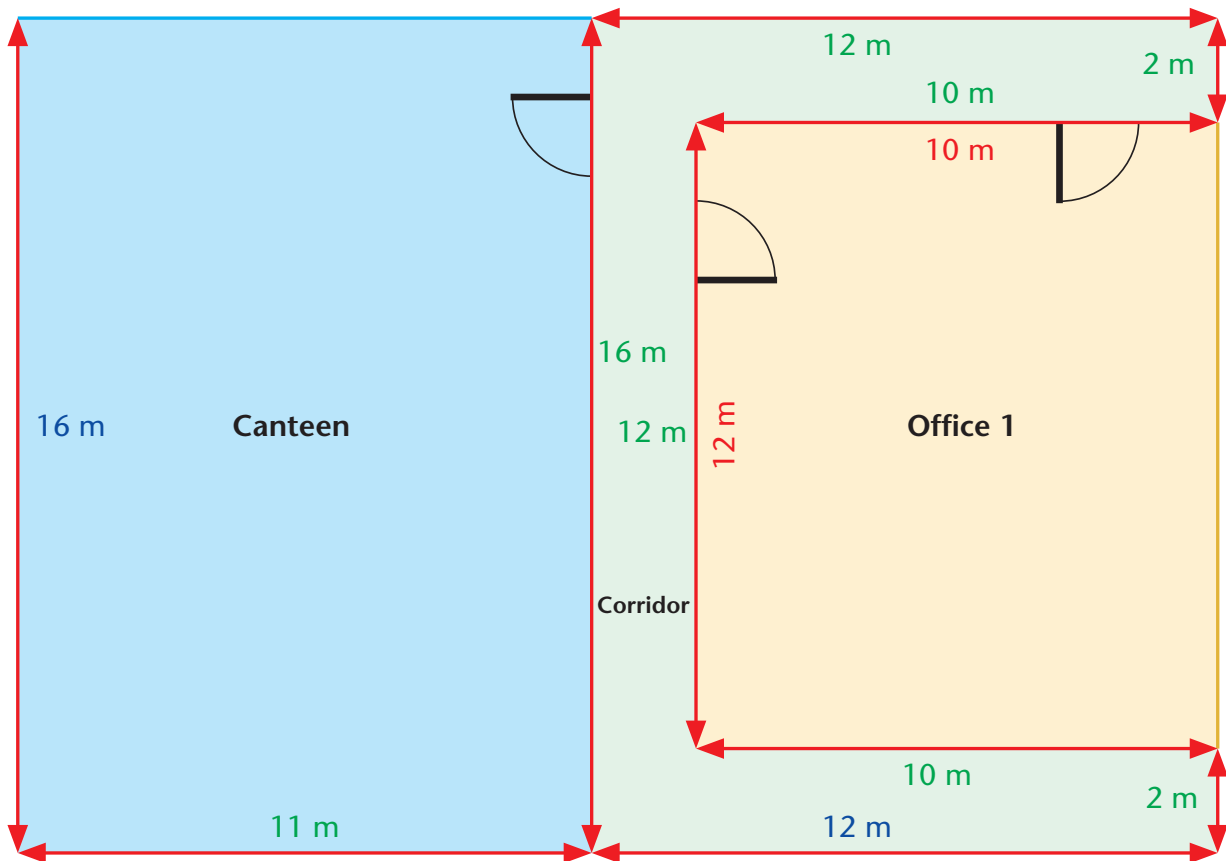
Task

Task 1

Look at the plan below. Write down the measurements for each room and calculate its perimeter.

Remember!

The **perimeter** of a room is the distance all the way around it.



Tip

In **rectangular** rooms, the opposite sides are the same length.

1 Canteen

Measurements:

Perimeter = _____ metres

2 Office 1

Measurements:

Perimeter = _____ metres

3 Corridor

Measurements:

Perimeter = _____ metres

PAGES 2:8–2:10

Area

Occupational setting

Establishing the amount of materials required to complete a job is essential if the job is to be finished on schedule and within budget. This usually means calculating the area of walls and ceilings from measurements – given or from plans. This theme assumes that learners are able to carry out measurement accurately and can read and record measurements in decimal format.

Materials

Calculators

Simple plans and sketches of walls and ceilings/floors with dimensions in metres

Learning outcomes

- 1 To know that area is a measure of surface (focus page, Tasks 1–3)
- 2 To know what measurements are required to calculate the area of a rectangular ceiling and wall and how to obtain them (focus page, Tasks 1–3)
- 3 To know how to calculate area in the context of rectangular ceilings and walls (focus page, Tasks 1–3)
- 4 To know that area is measured in square units (focus page, Tasks 1–3)
- 5 To know how to break down a composite shape into regular shapes (Task 3)

Suggested teaching activities

Introduction

- Discuss why area might need to be measured. Confirm that area is required when estimating materials for costing jobs and planning your daily schedule.
- Use Module 3 of *Skills for construction* to develop area calculation skills, if necessary.
- Confirm that area is measured in square units – square metres, centimetres or millimetres, written as m^2 , cm^2 or mm^2 . Confirm that the industry standard is m or mm (or both). In

painting and decorating, area is usually calculated in m^2 , to a whole unit or a single decimal place. Give examples of this.

Focus page

- Go through the examples on the focus page, relating these to learners' experiences, if possible. Additional practice ideas can be found in Module 3 of *Skills for construction*. Ensure learners have a sound grasp of this information before progressing.
- Ask learners how they would measure a ceiling to find its area. Ask them to assess safety issues and risks involved with their method.
- If learners suggest measuring the floor instead, ask if ceilings always have the same area as the floor. Can they think of any exceptions? Unless a room has a sloping ceiling (e.g. a loft conversion) or sloping walls (e.g. cottage or dormer bedroom), the ceiling area will be the same as the floor area. It is also possible in some settings that floor areas will be painted, as well as the ceiling.
- Various language issues may arise when teaching how to calculate area. Ensure learners understand what is meant by length, width and height.
- Note: when calculating the area of walls in a rectangular room, the formula $l \times h$ may be confusing to some learners. (When finding the area of the shorter walls, it could be perceived as the width of the room needing to be multiplied by the height). Emphasise that a rectangular surface is a two-dimensional space and that the area is found by multiplying its two linear measurements together (whatever the technical terms we give to these two measurements).

Curric. refs	NOS/NVQ	Key Skills
MSS1/L1.9	VR331	N1.2
	VR333	N1.3
	VR336	

Task 1

Work out the area of a ceiling

MSS1/L1.9

- Check that learners are familiar with the plan format shown on the page.
- Briefly recap the method for finding the area of a ceiling, using the theme on area from Module 3 of *Skills for construction*.
- Encourage learners to estimate the areas of the three ceilings by rounding the decimal numbers to the nearest whole number. This will be common practice within the occupation.
- If necessary, review learners' understanding of scale architectural drawings, including the use of standard representations of doors and windows.
- Remind learners of the procedure for multiplying decimal numbers. Ensure that all learners feel confident in doing this. Provide opportunities to consolidate these skills as necessary.
- Ask learners to check their answers against their original estimates.

If the learner has difficulty

- Use the ideas listed in the theme on area in Module 3 of *Skills for construction*.
- Work with learners to understand which aspect of the problem is causing difficulty, then work on this part of the process. Watch out for number sequencing problems (right numbers, wrong order) and number reversals (e.g. 2 instead of 5), typical of dyslexic learners. Careful attention is needed to avoid this type of error.
- Encourage learners to practise more area calculations using whole numbers. Then progress to using decimal numbers.
- Use aids such as metre rules and pieces of card.
- Break down drawings into separate rectangles with their dimensions marked. Ask learners to extract the measurements they need. Ask learners to identify the process and calculations to be made. Observe them completing these calculations to identify any problem areas.

Extension

Encourage learners to find the area in square metres of rectangular walls and ceilings on plans where measurements are given in millimetres. They could convert these to metres.

Task 2

Work out the area of a wall

MSS1/L1.9

- Briefly recap the formula for finding the area of a wall.
- Encourage learners to estimate the areas of the wall space by rounding the decimal numbers to the nearest whole number.
- Remind learners that this calculation relates to a wall with no doors or windows.

If the learner has difficulty

Learners who are still having difficulty will need additional support from a numeracy teacher and may benefit from some assessment to identify the nature of their difficulty.

Extension

Ask learners to measure a rectangular wall, for example in the workroom, at home, or elsewhere in the building, and find the area in square metres.

Task 3

Work out areas of walls with doors

MSS1/L1.9

- Talk about what would happen if there is a door and/or window, or more than one of each, in a wall. Illustrate by referring to the walls in the workroom if necessary.
- Work through the three-step process, at each stage asking learners what they should do next and checking understanding.
- Review learners' understanding of the process of decimal subtraction by giving some quick check questions. Further work on subtracting decimal numbers can be found in *Skills for Life Numeracy*, Level 1.
- Encourage learners to estimate the area at each step of the calculation process.
- Point out to learners that the door measurement shown here is not standard. A standard door is usually 0.8 metres wide.

If the learner has difficulty

- As for tasks 1 and 2.
- Further work on subtracting decimal numbers can be found in *Skills for Life Numeracy*, Level 1. Learners may be encouraged to use calculators, but again support them in estimating their answers and analysing errors.
- Provide further opportunities to practise similar calculations, perhaps using whole numbers until learners understand the concept.
- Encourage learners to use the drawing tools on 'Word' or 'Paint' to explore the visual impact of placing a smaller rectangular shape on a larger one.
- Some learners, for example those with dyslexia or those with memory impairment, might experience difficulty in remembering the sequence of steps needed to perform the entire calculation. These learners may need frequent prompts in relating the processes, that is multiplying to find the areas of both rectangles, then subtracting the larger area from the smaller. Dyslexic learners may also be confused by the difference between the language order 'Take Y away from X' and the calculation order $X - Y =$.

Extension

- Ask the learner to calculate the area of:
 - a wall with a window and a door, or two windows
 - the floor in an L-shaped room.
- You might like to extend this skill to the area of circles and more complex composite shapes.

Theme assessment

- Encourage learners to use the estimation skills developed in these tasks to calculate the areas of walls and ceilings in the workplace that they are working on currently, estimating measurements first.
- Ask the learner to measure and work out these areas, taking into account major openings such as doors and windows.
- Set more tasks involving mixed units of measure, or more complex shapes based on rectangles.

Area

Focus

To find out how much material it will take to cover a surface such as a ceiling or a wall, you need to calculate the **area**.

Tip

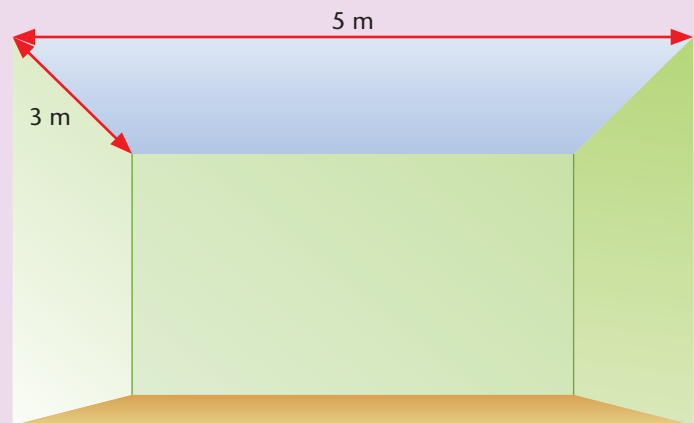
Manufacturers tell you the coverage of paint and wallpaper in **square metres (m²)**, so always use **metre measurements** when you calculate area.

To calculate the area of a rectangular ceiling.

- Find the length of the ceiling.
- Find the width of the ceiling.
- Multiply the length by the width ($l \times w$).

Example:

This ceiling has an area of 15 m²
($5 \times 3 = 15$).


Tip

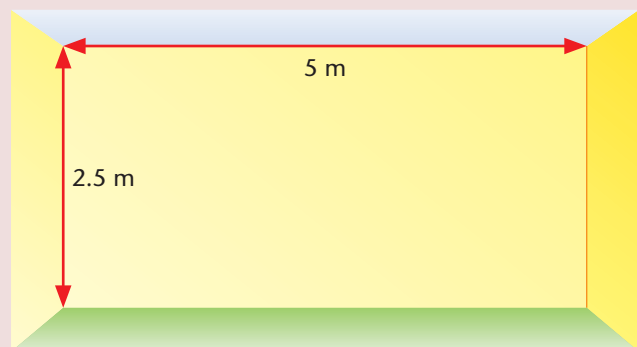
In most rooms, the length and width of the ceiling **is the same as** the length and width of the floor. Unless a room has a sloping ceiling or sloping walls, **measure the floor** instead. It's far **easier**, and **safer** too!

To calculate the area of a rectangular wall.

- Measure the length of the wall.
- Measure the height of the wall.
- Multiply the length by the height ($l \times h$).

Example:

This wall has an area of 12.5 m²
($5 \times 2.5 = 12.5$).

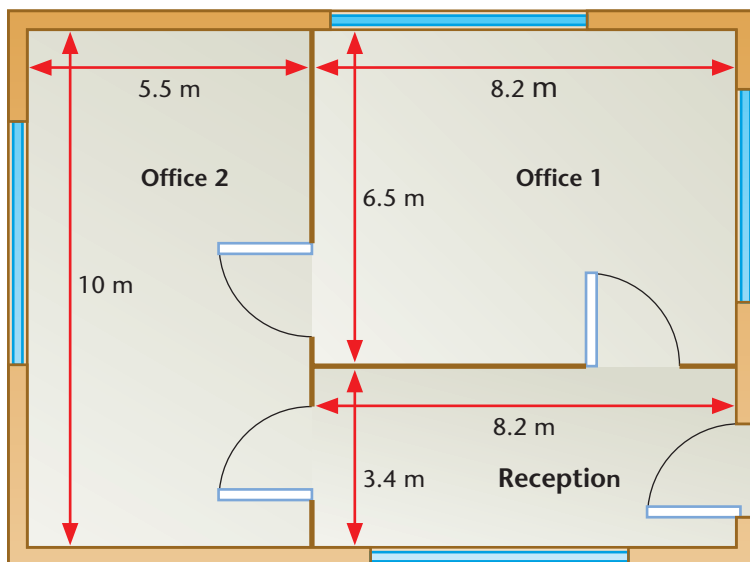


Area

Task

Task 1

Each of the rooms in the floor plan below has a flat ceiling that needs papering.



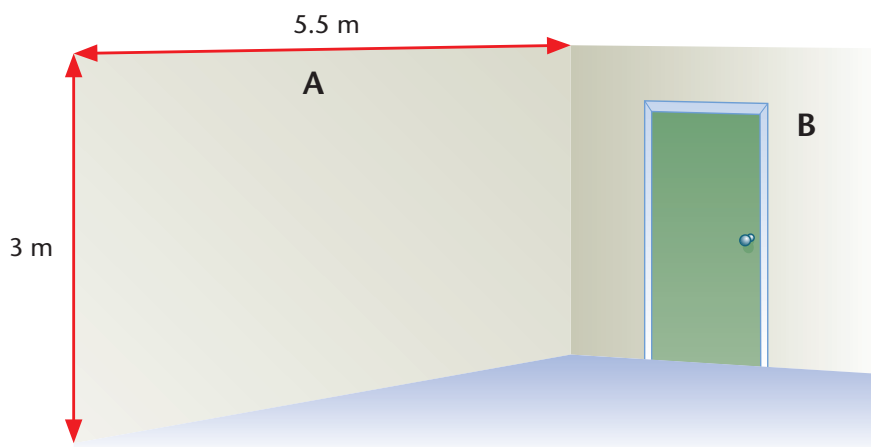
Remember!
Area of a rectangular ceiling = length × width

Use the floor plan to work out the area of each ceiling.

- 1 Area of the ceiling in **Reception** = ____ m × ____ m = ____ m²
- 2 Area of the ceiling in **Office 1** = ____ m × ____ m = ____ m²
- 3 Area of the ceiling in **Office 2** = ____ m × ____ m = ____ m²

Task 2

Wall A needs painting. Calculate the area of the wall.



Remember!
Area of a rectangular wall = length × height

Area of wall A = ____ m × ____ m = ____ m²

Area

Task

When calculating the area of a wall to find out how much paint to buy, you need to subtract the area of any windows and doors.

Step 1: Find the area of the whole wall.

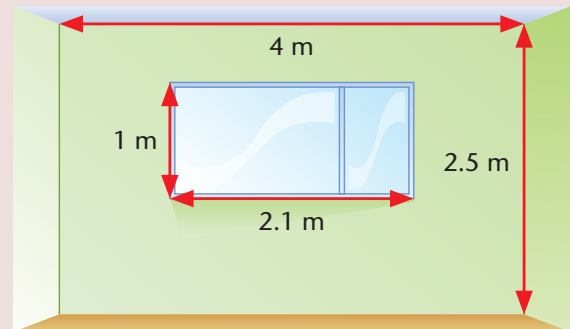
$$\begin{aligned} \text{Area of whole wall} &= \text{length} \times \text{height} \\ &= 4 \text{ m} \times 2.5 \text{ m} \\ &= 10 \text{ m}^2 \end{aligned}$$

Step 2: Find the area of windows and doors.

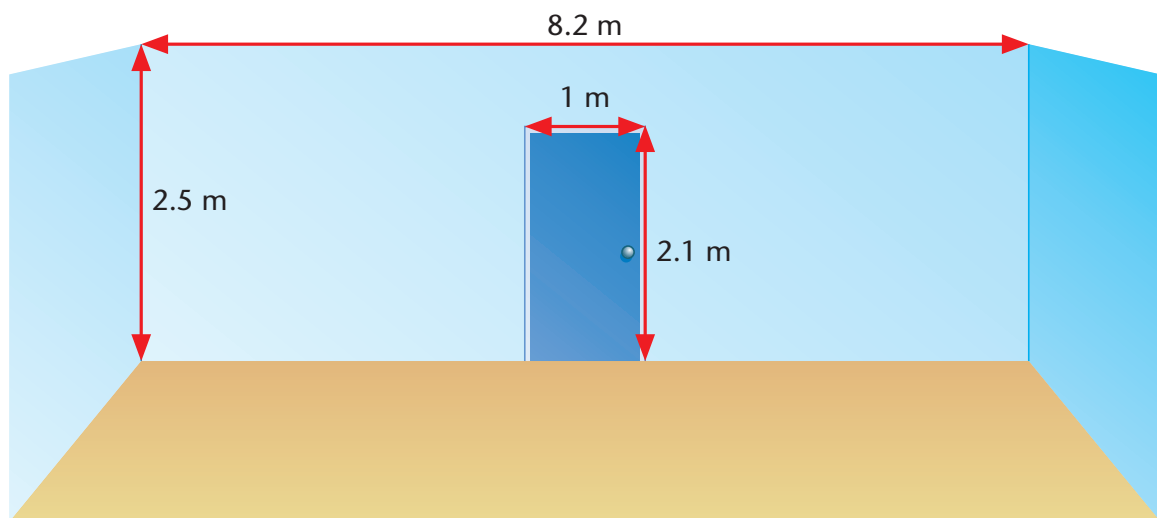
$$\begin{aligned} \text{Area of the window} &= \text{length} \times \text{height} \\ &= 2.1 \text{ m} \times 1 \text{ m} \\ &= 2.1 \text{ m}^2 \end{aligned}$$

Step 3: Subtract the area of the window from the area of the whole wall. You are left with the area that needs painting.

$$\begin{aligned} \text{Area that needs painting} \\ &= 10 \text{ m}^2 - 2.1 \text{ m}^2 = 7.9 \text{ m}^2. \end{aligned}$$



Task 3



The **wall** shown above needs papering. What is the area to be papered?

1 Area of the whole wall = ____ m × ____ m = ____ m²

2 Area of the door = ____ m × ____ m = ____ m²

3 Area that needs papering = ____ m² - ____ m² = ____ m²

Tip

Subtract the area of the door from the area of the wall.

PAGES 2:11–2:12

Estimating materials for painting

Occupational setting

Establishing the amount of materials required to complete a job is important if the job is to be completed on schedule and on budget. This means calculating the area of a room from a plan or from given measures and using guidance on coverage rates from products in order to estimate the amount of paint needed. Learners need to be able to calculate area and use information on coverage rates, taking account of the particular conditions. Learners working for large contractors are unlikely to use these skills; however, all apprentices should be competent in these tasks.

Materials

Calculators

Range of tins of paint products or other information, showing different coverage rates

Learning outcomes

- 1 To understand and use a method of calculating area of a rectangle (focus page, Task 1)
- 2 To understand information on products about coverage rates (focus page, Task 1)
- 3 To use this information to estimate materials (focus page, Task 1)

Suggested teaching activities

Introduction

- Discuss learners' experience of using coverage information to estimate the amount of paint needed for a specific job. Do they have experience of over- or under-estimating? What are the consequences of this?
- How do they work out how much paint to use? Is it just good guess work? What are the dangers of this? How accurate is good guess work? (It can be very accurate if you're experienced, but how do you get experience?)

Focus page

- Work through the methods and questions on the focus page. Remind learners about calculating area (see previous theme).
- Learners need to understand the relationship between the area calculation and the liquid measure of paint, and that this is referred to as the coverage rate. Look at different examples of how this is recorded on products.
- Ask learners to check the area calculations with a calculator, if appropriate.
- Look in some detail at the two different methods of estimating paint quantities shown. Which do learners prefer? Do they have a different method? Ask them to explain this and check it achieves an accurate result. If required, go back to basics to work out the coverage as follows:
 - 1 litre covers 12 m^2
 - 2 litres covers $12 \text{ m}^2 + 12 \text{ m}^2$ OR $2 \times 12 \text{ m}^2$
 - 3 litres covers $12 \text{ m}^2 + 12 \text{ m}^2 + 12 \text{ m}^2$ OR $3 \times 12 \text{ m}^2$
 - so 5 litres covers $5 \times 12 \text{ m}^2$.
- Work through both methods in this step-by-step way if needed.
- Look at the issue of rounding up to get a sensible quantity, for example you can't buy a 7 litre tin of paint, the nearest you can get is a 5 litre tin plus a 2.5 litre tin. Confirm that there is not much point in rounding down.
- Apply these methods to rooms of different dimensions and the different coverage rates for products you have looked at earlier.
- This is a good opportunity to talk about acceptable levels of wastage and what can be done about this.

Curric. refs	NOS/NVQ	Key Skills
N1/E3.4	VR331	N/A
N1/E3.6	VR333	

Task 1

Estimate area of coverage

N1/E3.6

N1/E3.4

- The area to be covered is 60 m^2 . The special effects paints will be layered: two layers of base coat are needed, with one layer of top coat, then one layer of glaze for durability.
- Point out that the three different types of paints have different coverage rates. Ask which type covers the largest area.
- Talk through the process of the calculation, dividing the area by the coverage rate, then giving the answer to the nearest 5 or 2.5 litre.
- Point out that the rate per litre is the same for tins containing the same paint type, regardless of the size of the container (i.e. a 5 litre tin of base coat has the same coverage per litre as a 2.5 litre tin of the same base coat).
- Point out that a 5 litre tin is usually cheaper than two 2.5 litre tins.

If the learner has difficulty

- You may need to work through the whole problem with the learner. In particular, watch for the requirement for two coats of base coat. Make sure learners understand that the 5 litre tins are better value.
- The maths involved here is to divide the area by the coverage rate. Learners experiencing difficulties with this kind of calculation may need support with *Skills for Life* materials, but should be encouraged to use a calculator. They may benefit from tackling the calculation through repeated subtraction.
- It is possible that a dyslexic learner might reverse the sequence of the operation (dividing the coverage by the area). Watch out for this and talk through the process again, relating it to the real activity of painting a wall. Dyslexic learners may have difficulty remembering formulas correctly. Offer cue cards as a memory aid.

Extension

Calculate how many litres of base coat, top coat and glaze will be left over and how many square metres this would cover.

Theme assessment

Have learners apply these estimation skills to real workplace situations, involving a range of products with different coverage rates and larger and smaller areas of varying complexity.

Estimating materials for painting

Focus

Calculating the amount of paint you need is an important part of preparing for the job.

Most paints tell you the **coverage per litre**.

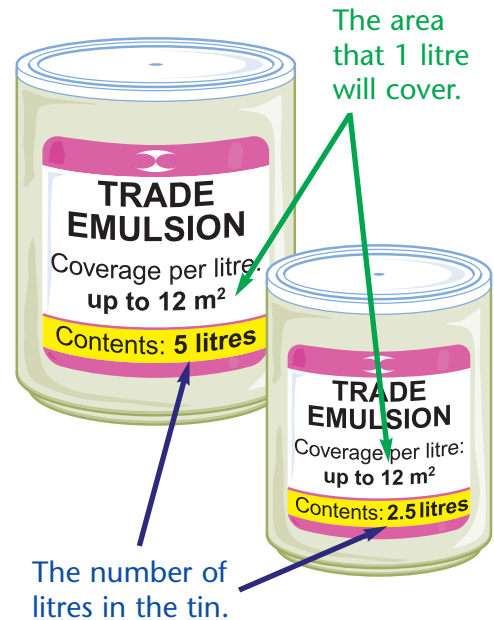
If you want to find out the **coverage per tin**, multiply the **coverage per litre** by the **number of litres in the tin**.

Example:

1 litre of this trade emulsion covers up to 12 m^2 , so **5 litres** will cover up to 60 m^2 ($12 \times 5 = 60$).

Remember that this is for **one coat** of paint.

What area will a **2.5 litre** tin of this emulsion cover?
Up to _____ m^2



There are **different methods** of working out how much paint you need for a job.

Coverage per tin

I work out the **area** that **each size of tin** will cover. Then I compare it to the **area** that I'm painting.

For example, I need to paint 84 m^2 .

A **5 litre tin** will cover up to 60 m^2 ($12 \times 5 = 60$).

A **2.5 litre tin** will cover up to 30 m^2 ($12 \times 2.5 = 30$).

So a **5 litre tin** plus a **2.5 litre tin** will cover up to 90 m^2 ($60 + 30 = 90$).

That's enough to cover the area I'm painting with one coat, with some left over.

What area will the leftover paint cover? _____ m^2

Working from the area

I work it out using a different method.

1 litre of paint will cover up to 12 m^2 with one coat. If I need to paint 84 m^2 , I divide 84 by 12 to find how many **litres** I need.

$84 \div 12 = 7$, so I need **7 litres** of paint.

If I buy a **5 litre tin** and a **2.5 litre tin**, I'll have **7.5 litres**.

That's enough litres of paint with some left over.

How many **litres** of paint will be left over? _____ m^2

Remember!

The rate of coverage can be affected by things such as temperature, technique and surface condition. It's better to have too much paint than not enough.

Estimating materials for painting

Task

Special offer on Special Effects

5 litres £19.99

2.5 litres £12.99

Tips

- Check the tin for information on coverage and compare it with your measurements.
- Use whichever calculation method you find easier to work out the quantity to buy.

Task 1

You have been asked to buy some Special Effects paints. What is the minimum number of tins of each size that you need for these jobs?

1 Apply **2 coats of base coat** to an area of **60 m²**.

Buy _____ × 5 litre tin(s) and _____ 2.5 litre tin(s).

2 Apply **top coat** to an area of **60 m²**.

Buy _____ × 5 litre tin(s) and _____ 2.5 litre tin(s).

3 Apply **glaze** to an area of **60 m²**.

Buy _____ × 5 litre tin(s) and _____ 2.5 litre tin(s).

PAGES 2:13–2:14

Estimating materials for wall and ceiling covering

Occupational setting

Good estimation is important for efficient use of materials. Estimating materials that are sold in rolls of standard width involves different skills to those needed to calculate the coverage of paint, although an underpinning confidence with measures is required for both. Estimating materials for papering usually involves the use of charts. This theme develops the skills required to read and interpret such charts and use the information to estimate materials. This theme relates to the NVQ Unit VR336, which is about standard papers.

Materials

Wallpaper coverage guide from the Source material (0:15)

Wallpaper paste mixing and coverage guide from the Source material (0:16)

Similar charts from the workplace

Learning outcomes

- 1 To read and understand charts of information (focus page, Task 1)
- 2 To understand the concept of estimating materials and the need to round up to the next whole standard unit (focus page, Task 1)

Suggested teaching activities

Introduction

- Ask learners about their experience in estimating materials for wallpapering jobs. How is this done? Have they experienced any difficulties with over- or under-estimating? What is the impact of this?
- Introduce the language needed to complete this theme and write the terms on the board/flipchart. Discuss and agree the meanings of terminology and mathematical language.

Focus page

- Look at the wallpaper coverage guide chart on the focus page (which is an extract from the full version in the Source material). Ask learners to look at the layout of this coverage guide and point out the features (e.g. title, numbers arranged in a chart, other information). Compare with similar charts from the workplace. Do they all have the same features?
- Point out that coverage guides like this are used to *estimate* how much material you need. Explain that amounts are shown as ranges (e.g. 2.30 m to 2.45 m). Give some practice examples to ensure that this is clear. Learners who have difficulty with place value and decimals may need additional support before they can tackle this task.
- Look at the asterisk in the title of the chart and the related information below the chart. Ensure that learners understand the purpose of the asterisk and that the information is important.
- Work through the steps, showing how to read the chart.
 - The column headings list different **perimeters**.
 - The row headings list different **room heights** and these are shown as a range (e.g. 2.75 m to 2.90 m, 2.90 to 3.05 m).
 - The figures in the table show the **number of rolls** for standard wallpapers.
- Discuss what to do if the perimeter is *between* those shown on the column headings.
- Discuss what to do if the room height is:
 - between those shown on the column headings
 - listed in more than one range of heights
- Ensure learners understand that the guide provides an *estimate* of the amount of material needed. Point out that sometimes they will have to choose between two estimates. For example, a room has a perimeter of 9 m and a height of 2.75 m. Depending on which height range you use on the chart (i.e. 2.60 to 2.75 or 2.75 to 2.90), you get a different number of

rolls. Discuss whether it is generally better to have too much or not enough material. When faced with a choice, is it better to choose the larger or smaller amount? If you are left with surplus rolls, can they be returned to the retailer? If you don't buy enough rolls, will you be able to get more with the same batch number?

- Confirm that the chart is based on a standard roll of paper (approx. 10.05 m long by 0.53 m wide, with a standard repeat of 23 cm). What happens if you have to use paper that is not standard (e.g. larger repeat)?
- Confirm the importance of double-checking calculations.

Curric. refs	NOS/NVQ	Key Skills
HD1/L1.1	VR336	N2.1

Task 1

Estimate paper and paste requirements, using a chart

HD1/L1.1

- Ensure learners have the Wallpaper coverage guide and the Wallpaper paste mixing and coverage guide from the Source material.
- Examine the Wallpaper coverage guide from the Source material. Ensure learners know how to use the chart. Ensure they understand the term 'perimeter' and know what this measurement means.
- Examine the Wallpaper paste mixing and coverage guide from the Source material.
 - Use titles and column headings to get the gist of the contents of the table. Ensure learners understand the meaning of 'adhesive'. What other words are used? (paste/glue).
 - Ensure learners understand that the first column contains descriptions of different types of wallpaper that the paste can be used with, the second contains information on amounts of water to mix with one sachet of paste, and the third contains information on the amount of wallpaper that one sachet of paste will cover.
 - Ask learners to give examples of **when** they would use the table of information.
 - Ask which columns they will use for the task (first and third columns).

- Discuss the task.
 - Point out to learners that they should first find the amount of wallpaper required for the room, using the room dimensions and Wallpaper coverage guide.
 - Once they know the number of rolls of paper, they can then use the Wallpaper paste mixing and coverage guide to find how many sachets of paste are required for the number of rolls of paper that they need. They will need to do this for the type of paper described in the task.

If the learner has difficulty

- Work with the learner on the different steps of the task, identifying specific areas of difficulty. These may include locating the correct perimeter to read and the correct height.
- Note that learners with dyslexia may have problems with the tracking skills needed when extracting information from a chart. Encourage them to use a guide of some kind (e.g. a ruler or card).
- Learners may need help understanding the technical terms used in the charts (e.g. 'polystyrene' and 'vinyls'). Encourage them to use the glossary.

Extension

Look at calculations for non-standard rolls of paper (e.g. a roll that is half the standard length, or where the repeat is different). How would this affect the number of rolls required?

Theme assessment

Learners should measure the perimeter of a room and estimate paper and paste, using these charts.

Estimating materials for wall and ceiling covering

Focus

Wallpaper and paste manufacturers produce coverage guides to help you estimate how much material you will need for a job. Information is often set out in a table.

These **instructions** tell you what to do.

The **title** tells you what information is contained on the table.

Information is organised in **rows** → and **columns** ↓

How do I estimate how many rolls of wallpaper I will need?

WALLS

- Measure the distance around the room (the perimeter), doors and windows included.
- Measure the height of the room from the skirting to the ceiling.
- Use the following table to estimate the number of rolls that you need.

Wall height (skirting to ceiling)	Distance around the room (perimeter)								
	9 m	10 m	12 m	13 m	14 m	15 m	16 m	17 m	18 m
2.15 m to 2.30 m	4	5	5	6	6	7	7	8	8
2.30 m to 2.45 m	5	5	6	6	7	7	8	8	9
2.45 m to 2.60 m	5	5	6	7	7	8	9	9	10
2.60 m to 2.75 m	5	5	6	7	7	8	9	9	10
2.75 m to 2.90 m	6	6	7	7	8	9	9	10	10
2.90 m to 3.05 m	6	6	7	8	8	9	10	10	11

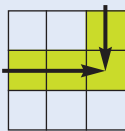
Step 1: Read the instructions to find out what you need to do.

Step 2: Read the title and the **column and row headings** to find out how information is organised in the table.

Step 3: Track **across the rows** → and **down the columns** ↓ to find specific information.

Tip

Using a finger or a ruler can help.



Step 4: Check to make sure you haven't made a mistake.

Remember!

Coverage guides like the table on this page help you to **estimate** amounts of material.

The room that I'm papering has a **perimeter of 17 metres** and a **height of 2.8 metres**. I estimate that I will need **10 rolls** of wallpaper.



Try this

How many rolls of wallpaper are required for a room with a perimeter of **16 m** and a height of **2.35 m**? Use the table above to estimate.

Estimating materials for wall and ceiling covering

Task

Task 1

You will need the Wallpaper coverage guide and the Wallpaper paste mixing and coverage guide from the Source material.

Use the coverage guides to work out **how many rolls of wallpaper** and **how many sachets of wallpaper paste** you will need for each of the following jobs.

1

Room measurements
Perimeter: 16 metres
Height: 2.75 metres

Materials required:

_____ roll(s) of lining paper
_____ sachet(s) of wallpaper paste

2

Room measurements
Perimeter: 21 metres
Height: 2.90 metres

Materials required:

_____ roll(s) of embossed wallpaper
_____ sachet(s) of wallpaper paste

3

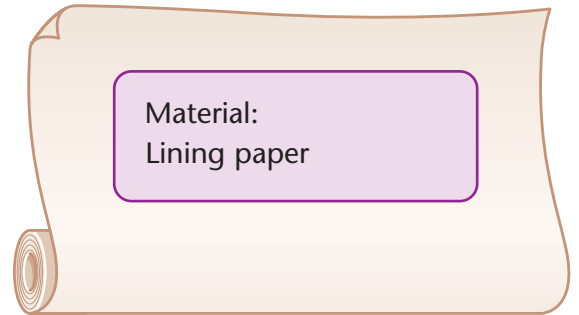
Room measurements
Perimeter: 11 metres
Height: 2.45 metres

Materials required:

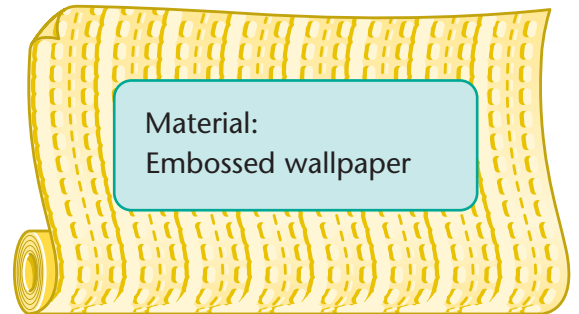
_____ roll(s) of vinyl wallpaper
_____ sachet(s) of wallpaper paste

Tips

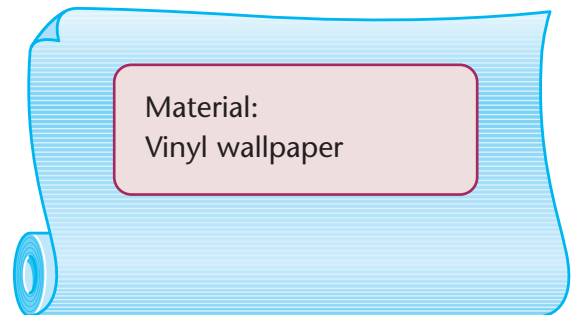
- First find how many **rolls** of wallpaper you need.
- Then find out how many **sachets of paste** it will take for the **type of wallpaper** you are using.



Material:
Lining paper



Material:
Embossed wallpaper



Material:
Vinyl wallpaper

PAGES 2:15–2:16

Working out the cost of materials

Occupational setting

Many workers in this sector are, or may become, self-employed, so will need to estimate costs in order to provide quotes for clients. This theme develops some of the money calculation, number calculation, estimating and approximation skills required. It assumes that learners are confident with measurement of length – measurement skills are developed in other themes, as are some estimating skills. Further themes on quoting and invoicing can be found at the end of Module 5.

Materials

Trade catalogues

Samples of estimates and invoices for work (including materials)

Samples of blank invoices and estimates pro forma, if available

Calculators

Learning outcomes

- 1 To develop estimation and approximation skills (focus page, Task 1)
- 2 To develop money calculation skills, with and without a calculator (focus page, Tasks 1 and 2)

Suggested teaching activities

Introduction

- Discuss learners' involvement in developing estimates or quotes for clients. Who does this in their workplace? Why is it done? What are the consequences of quotes being incorrect?
- What level of accuracy is required – does an estimate need to be accurate to the nearest penny?
- Establish the difference between a quote (estimate) and an invoice. Show some examples of estimates and invoices.

Focus page

- Work through the examples of estimates and invoices on the focus page, ensuring learners can follow the maths.
- In particular, focus on the rounding involved in approximating costs. You may need to talk about rounding to the nearest whole pound if learners are unfamiliar with this concept. Give more examples of the costs of materials for additional practice.
- Focus on the layout of the invoice, showing how materials are listed systematically (so it is clear for clients) and labour costs are shown separately. Look at the layout of the £ and p columns and discuss how this helps to get the sum correct. An important cost is missing from this invoice – VAT. What is it for? How much is it? If appropriate, discuss how to calculate this additional charge, with and without a calculator.
- You may want to take this opportunity to get learners to work out an estimate for materials for a particular room, using information from trade catalogues and a blank estimate pro forma. (Note however, that this is covered in more detail at the end of Module 5.)
- You may want to take this opportunity to get learners to work out an invoice for materials and labour for the same room, using information from trade catalogues and a blank invoice. (Note however, that this is covered in more detail at the end of Module 5.)

Curric. refs	NOS/NVQ	Key Skills
N1/E3.8	VR02	N/A
N2/E3.4	VR331	
	VR332	
	VR333	
	VR336	

Task 1

Work out approximate costs and check using a calculator

N1/E3.8

N2/E3.4

- In this task learners choose an approximate calculation based on given costs. Check learners understand that they are to round costs to arrive at an approximate cost.
- Encourage a self-checking approach – does the answer seem about right?
- Once learners have completed the approximation, ask them to do the exact calculation using a calculator. How close was their estimate?

If the learner has difficulty

- Check learners understand the question and that they are to estimate, for example, for 12 rolls of wallpaper and two sachets of wallpaper paste.
- Help learners to do the rounding – the price of the paste is best rounded to £2.50 (not a whole pound).
- Encourage learners to make a note of each stage of the calculation.
- Observe learners using the calculator to ensure that they key in numbers and functions in the correct order. Dyslexic learners may need support with this.

Extension

- Give estimates for a job (using a given amount of materials) with prices obtained from trade catalogues for different paint/wallpaper manufacturers.
- Give additional examples where there are no multiple-choice answers.
- Give additional practice in this skill using a mental maths approach (i.e. the information is given verbally and the response is verbal, not written).

Task 2

Complete an invoice using a calculator

N2/E3.4

- Encourage learners to do the addition using a written method first. Suggest that they estimate the total before starting.

- They should then check using a calculator. This task requires careful keying in of numbers.
- If the totals achieved do not correspond, then learners should start again, trying to identify where they made the mistake.
- Confirm the importance of invoices being correct.

If the learner has difficulty

- Observe the learner to discover where errors are being made in the written or calculator methods. Further support for either of these can be provided using *Skills for Life* materials.
- This is a fairly lengthy calculation, and dyslexic learners may have difficulty holding the number information in their short-term memories. Support the learner to do the calculation in stages (e.g. ceiling, walls, etc.) or to tick each number as it is dealt with.

Extension

Ask learners to add VAT to the invoice.

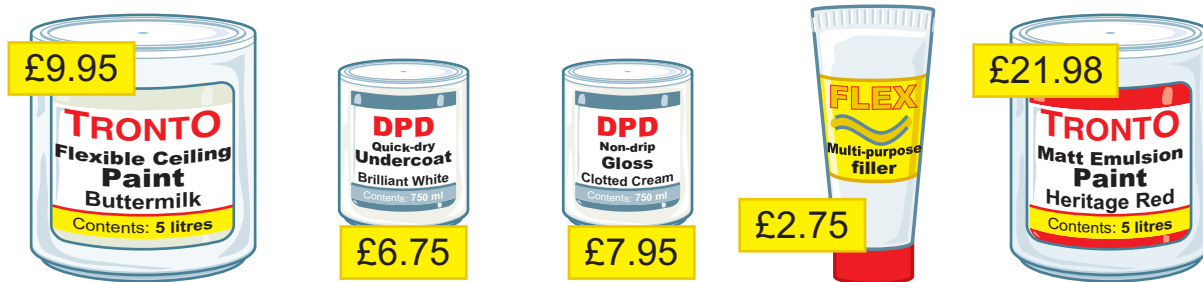
Theme assessment

Ask learners to write an estimate and an invoice for work completed, based on a real job (i.e. known quantities of materials and time taken).

Working out the cost of materials

Focus

If you are self-employed or working for a small business you may need to work out the cost of materials.



If a customer asks for an **estimate** of the cost of materials:

- round the prices to make the calculation easier
- use mental methods to find the **approximate total cost**.

Well, let's see. Flexible ceiling paint is about £10. Filler and emulsion for the walls is approximately £25, and undercoat and gloss for the woodwork is another £15. I estimate it'll cost about £50 for the materials.



If a customer asks for an **invoice**:

- write the prices in a neat list
- use a calculator or written methods to find the **exact total cost**.

INVOICE		
J Bowmore & Sons (Painters and Decorators)		
27 Brook Close, Bexton		
Materials	£	p
<u>Ceiling</u>		
Flexible ceiling paint (Buttermilk)	9	95
<u>Walls</u>		
Filler	2	75
Matt emulsion (Heritage Red)	21	98
<u>Woodwork</u>		
Undercoat (Brilliant White)	6	75
Gloss (Clotted Cream)	7	95
Cost of materials	49	38
Plus labour: 4 days @ £100	400	00
TOTAL	449	38

Use the pounds and pence columns.

Work out the exact cost of materials.

Tip
Do the sum twice to check that you haven't made any mistakes.

Working out the cost of materials

Task

Task 1

What is the **approximate** cost of the materials for these jobs? Tick the price you would tell the customer.

- 1 12 rolls of *Windsor beige* wallpaper and 2 sachets of *Standard Paste* wallpaper adhesive.

- a About £35 to £40 b About £40 to £45
c About £45 to £50 d About £50 to £55



- 2 2.5 litres of dark oak wood preserver, 330 ml of *Bonds* wood filler and 750 ml of *JB's* clear exterior varnish.

- a About £10 b About £15
c About £20 d About £30



Task 2

Complete this invoice to show the cost of materials and total cost.

INVOICE A Hanson (Painter and Decorator) 5 Highford Lane Millington		
Materials	£	p
<u>Ceiling</u>		
Flexible ceiling paint (White)	9	95
<u>Walls</u>		
15 rolls of Buckingham embossed wallpaper @ £9.95	149	25
3 sachets wallpaper adhesive @ £2.48	7	44
<u>Woodwork</u>		
Undercoat (Buckingham White)	8	75
Gloss (Buckingham Royal White)	12	99
Cost of materials		
Plus labour: 5 days @ £100	500	00
TOTAL		

Tips

- Use a calculator or written methods to work out the cost of materials.
- Add the amount charged for labour to find the total cost.
- Check your answer.

PAGES 2:17–2:18

Diluting materials for priming

Occupational setting

On occasion, painters will need to mix or dilute materials to make them more suitable for a particular surface or to accommodate atmospheric conditions (e.g. very hot weather). Mixing primers will be a familiar task to most people in the painting industry. Learners need to be aware that different jobs need different amounts of primer, and that different products need to be diluted in different ratios. This theme looks at how to keep amounts in the proportions recommended by manufacturers.

Materials

Calculator

Multiplication square

Varnish, white spirit and vinyl matt paint
(Extension activities)

Learning outcomes

- 1 To understand the meaning of a simple ratio (focus page)
- 2 To understand the concept of proportion (focus page)
- 3 To use a ratio to mix amounts of materials in direct proportion (focus page, Tasks 1 and 2)

Suggested teaching activities

Introduction

- Check that learners understand the meaning of dilution.
- There are only a few occasions in painting when mixing and diluting are appropriate. Explore this with the group and identify the products that may require dilution and the reason for diluting. Write these on the board/flipchart.
- Ask learners for examples of when they have had to dilute materials or have mixed two or more different products together. How do they know what to mix and how much to mix? Discuss the possible effects of mixing too much

or too little of some products. Use everyday examples of this as well as examples from the painting setting (e.g. mixing concrete, mixing drinks, following recipes, etc.).

Focus page

- The focus page looks at the meaning of ratio, and the method for increasing in proportion.
- Using the 'Kings Trade Emulsion' example, emphasise the importance of the *order* of the ratio.
- Work through the example, again stressing the importance of the order of the ratio. Paint is the first item, so the new amount of 2.5 litres must be compared with the original amount of 5 litres (i.e. half as much).
- While you are going through the examples, ensure that learners understand the mathematical processes of doubling ($\times 2$) and halving ($\div 2$).
- The language used in this theme is important and may be a barrier to some learners. Check that learners are familiar with expressions such as 'double', 'twice', 'half', 'proportion' and 'ratio'. Flag these terms up and write them on the board/flipchart with examples or definitions.
- Note that ratio and proportion can be particularly difficult for dyslexic learners. They may need several simple examples in a variety of settings to build confidence and understanding. Conversely, they may find this exceptionally easy, as this is a very visual calculation.

Curric. refs	NOS/NVQ	Key Skills
N1/L1.7	VR330 VR332	

Task 1

Use simple ratio and direct proportion to calculate the amounts of materials required in a mix

N1/L1.7

Remind learners that using ratio involves keeping the proportion of materials the same.

If the learner has difficulty

- Does the learner understand the concept of ratio? If this is not clear, exemplify using practical examples with materials, money, food, etc.
- Does the learner understand the processes of multiplication and division as used in this task? Learners having difficulty with multiplying and dividing at this level will need additional support using *Skills for Life* numeracy materials (Entry 3 Unit 1).
- Encourage the use of a calculator or multiplication square.
- Suggest that the learner writes down the original ratio, and then writes the new given amount in the correct position underneath, as shown on the focus page. This makes it easier to see the direct relationship, and to remember which quantities need to be found.
- Learners may benefit from highlighting corresponding parts in the same colour (e.g. item name and ratio part are coloured the same). This will help learners make the connection.

Extension

- Give learners real materials to mix up this ratio of varnish to white spirit and see what effect it has on the properties of the materials. What happens if the ratio is altered?
- Remind learners of health and safety issues relating to these products before commencing the activity.

Task 2

Use simple ratio and direct proportion to calculate the amounts of materials required in a mix

N1/L1.7

- Remind learners that ratio is about keeping the proportion of materials the same.
- Check that learners can see the difference between the calculations needed for this task and Task 1.

If the learner has difficulty

- See Task 1.
- It is important to observe learners who are having difficulty and ask them to explain their strategies. This will help you to identify whether the specific area of difficulty lies with understanding the underpinning concept of ratio or if there are errors in their calculations.

Extension

Provide learners with real materials to mix up this ratio of vinyl matt to water and see what effect it has on the properties of the materials. What happens if the ratio is altered?

Theme assessment

Ask learners to use product labels and the Internet to find other examples of dilution ratios. In pairs, use the information they have found to present a range of problems to each other.

Diluting materials for priming

Focus

Paint manufacturers give instructions on how to dilute their products in the correct ratio.

You need less primer to treat a small surface than a large surface. Instead of telling you how much paint to measure out, manufacturers tell you to use a certain number of '**parts**' of paint and a certain number of '**parts**' of water or white spirit.

'Up to' means '**no more than**'. It suggests that amounts do not have to be measured out exactly.

KINGS TRADE EMULSION

PRIMING:

For sealing new or bare surfaces add *up to* 1 part water to 5 parts of emulsion.

1 part of water to 5 parts of emulsion is a **ratio**. Ratios **compare** one amount to another. In this example, the comparison is between **paint** and **water**. It tells you to use **5 times more paint** than water.

Try this

These instructions imply that it is OK to add **less** than the recommended amount of water but you should not add **more water** than it says. Why do you think this is?

It doesn't matter **how much** paint you use to make this primer. As long as you use **5 times more paint than water**, the result will be the same.

5 litres of paint + 1 litre of water

gives the same mix as

2.5 litres of paint + 0.5 litres of water

Tip

- Decide on the amount of paint first.
- Divide by 5 to find how much water to add.

Remember!

1 litre = 1000 ml



1 litre



$\frac{1}{2}$ litre

Diluting materials for priming

Task

Task 1

Complete the table to show how much polyurethane varnish and white spirit you should use to make a primer in the proportion described by the manufacturer.

KINGS POLYURETHANE VARNISH

PRIMING:
For sealing new or bare surfaces add *up to* 1 part white spirit to 10 parts of varnish.

Varnish	White spirit
500 ml	_____ ml
_____ ml	10 ml
150 ml	_____ ml
_____ ml	30 ml

Tip

There must be **10 times more varnish** than white spirit.

Task 2

Complete the table to show how much trade vinyl matt and water you should use to make a primer in the proportion described by the manufacturer.

KINGS TRADE VINYL MATT

PRIMING
Prime sound bare areas with 1 coat of trade vinyl matt of an appropriate shade thinned up to 1 part water to 5 parts of product.

Trade vinyl matt	Water
7.5 litres	_____ litres
_____ litres	1 litre
750 ml	_____ ml
1 litre	_____ ml

Tip

There must be **5 times more paint** than water.

Remember!

1 litre = 1000 millilitres (ml)

Check it

Please note that copies of the following Source material pages are needed:
0:13, 0:15, 0:16

Use the Job specification from the Source material (page 0:13) to answer questions 1 and 2.

1 According to the 'important guidelines', what should the job specification be read in conjunction with?

- A The British Standard Code of Practice
- B BS 6150:1991
- C Clause C40IJ
- D Site Work Instructions

Rt/L2.7

2 When making good you should 'use only good quality/compatible materials and follow the manufacturer's recommendations for use, even if at variance with this system.'

What does 'variance' mean in this context?

- A the same as
- B different from
- C up and down
- D equal to

Rw/L2.1

3 You are measuring a ceiling to see how many tins of paint you will need. Which unit of measurement will you use?

- A millimetres
- B centimetres
- C metres
- D kilometres

MSS1/E3.8

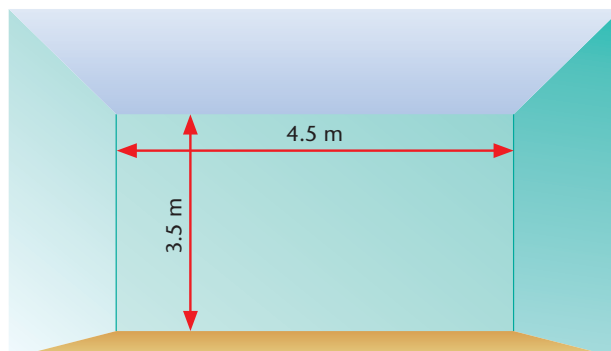
4 A rectangular room is 6 m long and 4 m wide. What is the perimeter of the room?

- A 10 m
- B 20 m
- C 24 m²
- D 24 m

MSS1/L1.8

5 This wall needs painting.
What is the area of the wall?

- A 15.75 m
- B 15.75 m²
- C 15.75 m³
- D 15.75



MSS1/L1.9

- 6 You are using this top coat to paint an area of 72 m².
What is the minimum number of tins you will need for the job?
- A 1
B 2
C 4
D 6



N1/E3.6

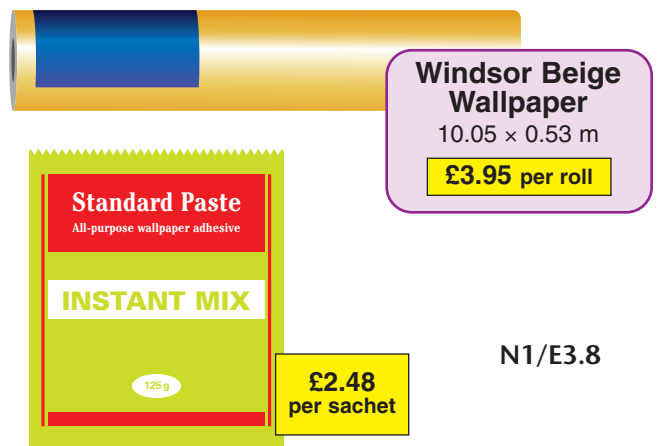
- 7 You will need the Wallpaper coverage guide from the Source material (page 0:15).
You are papering a room with a perimeter of 18 m and a wall height of 2.4 m.
How many rolls of paper will you need?
- A 7
B 8
C 9
D 10

HD1/L2.1

- 8 You will need the Wallpaper paste mixing and coverage guide from the Source material (page 0:16).
You will need 10 rolls of a heavy embossed paper for a room you are papering.
How many sachets of wallpaper adhesive will you need?
- A 2
B 3
C 4
D 5

HD1/L2.1

- 9 You need to buy eight rolls of Windsor Beige Wallpaper and two sachets of Standard Paste wallpaper adhesive.
What is the approximate cost of these materials?
- A £25-30
B £30-35
C £35-40
D £40-45



N1/E3.8

- 10 What is the total cost of eight rolls of Windsor Beige Wallpaper and two sachets of Standard Paste wallpaper adhesive?
- A £36.56
B £36.65
C £31.60
D £68.16

N2/E3.4

Answers

PAGES 2:1–2:3

Working from a job specification

Focus page

The comma shows that there are several jobs to do.

The brackets separate off extra information.

'friable' means 'easily crumbled'

'etc.' is short for 'etcetera', meaning 'and so on'.

Task 1

- 1 c roughness on a surface
- 2 1 part water to 5 parts product
- 3 Clause C401j
- 4 room temperature and humidity
- 5 You may have said something like this: 'If you use the Coverall Twincoat Nouveau Roller you will have to even up the pattern it makes by finishing gently with up and down strokes.' You may also have demonstrated what to do using your arms!

PAGES 2:4–2:5

Measurement

Focus page

Show your completed table to your teacher.

Task 1

Discuss your answers with your teacher.

PAGES 2:6–2:7

Perimeter

Focus page

Decorating jobs that involve painting or fixing materials around the perimeter of a room = decorative borders, coving, dado rails and skirting boards

Ballroom perimeter:

$$20 \times 2 = 40$$

$$12 \times 2 = 24$$

$$40 + 24 = 64$$

or

$$20 + 12 + 20 + 12 = 64$$

Task 1

1 Canteen

Measurements: $11 + 16 + 11 + 16$

Perimeter = 54 metres

2 Office 1

Measurements: $12 + 10 + 12 + 10$

Perimeter = 44 metres

3 Corridor

Measurements: $2 + 12 + 16 + 12 + 2 + 10 + 12 + 10$

Perimeter = 76 metres

PAGES 2:8–2:10

Area

Task 1

1 Area of the ceiling in **Reception** = $8.2 \text{ m} \times 3.4 \text{ m} = 27.88 \text{ m}^2$

2 Area of the ceiling in **Office 1** = $8.2 \text{ m} \times 6.5 \text{ m} = 53.3 \text{ m}^2$

3 Area of the ceiling in **Office 2** = $10 \text{ m} \times 5.5 \text{ m} = 55 \text{ m}^2$

Task 2

Area of the wall = $5.5 \text{ m} \times 3 \text{ m} = 16.5 \text{ m}^2$

Task 3

1 Area of the whole wall = $8.2 \text{ m} \times 2.5 \text{ m} = 20.5 \text{ m}^2$

2 Area of the door = $2.1 \text{ m} \times 1 \text{ m} = 2.1 \text{ m}^2$

3 Area that needs painting = $20.5 \text{ m}^2 - 2.1 \text{ m}^2 = 18.4 \text{ m}^2$

PAGES 2:11–2:12

Estimating materials for painting

Focus page

A 2.5 litre tin will cover an area of up to **30 m²**.

The paint left over will cover an area of **6 m²**.

There will be **0.5 litres** of paint left over.

Task 1

- 1 Buy 1 × 5 litre tin(s) and 1 × 2.5 litre tin(s).
- 2 Buy 1 × 5 litre tin and 0 × 2.5 litre tins(s).
- 3 Buy 1 × 5 litre tin and 0 × 2.5 litre tins(s).

PAGES 2:13–2:14**Estimating materials for wall and ceiling covering****Focus page**

8 rolls

Task 1

- 1 9 rolls of lining paper
1 sachet of wallpaper paste
- 2 12 rolls of embossed wallpaper
2 sachets of wallpaper paste
- 3 6 rolls of vinyl wallpaper
1 sachet of wallpaper paste

PAGES 2:15–2:16**Working out the cost of materials****Task 1**

- 1 d About £50 to £55
- 2 c About £20

Task 2

Cost of materials = £188.38
Total = £688.38

PAGES 2:17–2:18**Diluting materials for priming****Focus page**

The primer would be too thin. It wouldn't seal the surface correctly.

Varnish	White spirit
500 ml	50 ml
100 ml	10 ml
150 ml	15 ml
300 ml	30 ml

Task 2

Trade vinyl matt	Water
7.5 litres	1.5 litres
5 litres	1 litre
750 ml	150 ml
1 litre	200 ml

Check it

- 1 D
- 2 B
- 3 C
- 4 B
- 5 B
- 6 B
- 7 C
- 8 A
- 9 C
- 10 A

