

# 2

## The cost of driving

### Coverage

This unit is about working with money using large numbers, fractions, decimals and percentages. It covers percentage increases and decreases.

Learners will use a calculator to work out percentages and for calculations involving decimal multiplication and division.

Learners are introduced to the concept of scale and are required to use simple scales to work out distances.

At this level, learners are expected to build on the skills developed at Entry 3.

Commercially available games provide a useful way to improve learners' understanding of the skills introduced in this unit. Examples of these include decimal fraction and percentage dominoes.

### Skills

**N1/L1.1** read, order, write and compare numbers, including large numbers

**N2/L1.3** recognise equivalences between common fractions, percentages and decimals and use to find part of whole number quantities

**N2/L1.4** read, write, order and compare decimals up to three decimal places

**N2/L1.6** multiply and divide decimals by 10 and 100

**N2/L1.7** approximate decimals by rounding to a whole number or two decimal places

**N2/L1.8** read, write, order and compare simple percentages, and understand simple percentage increase and decrease

**N2/L1.9** find simple percentage increases and decreases

**N2/L1.10** find simple percentage parts of quantities and measurements

**N2/L1.11** use a calculator to calculate efficiently using whole numbers, fractions, percentages and decimals

**MSS1/L1.1** add, subtract, multiply and divide sums of money and record

**MSS1/L1.5** read, estimate, measure and compare distance

Many of the calculations and activities in this unit could be adapted for use on a spreadsheet.

Resources needed for effective teaching of this unit:

Demonstration	Group	Pair	Individual
Distance charts	Flipcharts	Rulers	Rulers
Road atlases	Calculators	Paper	Calculator
Board	Pens	Pen	Paper
	Rulers	Calculators	Pen
	Paper		
	Distance charts		
	Road atlases		

## Reminder

In the Links, H means Help, E means Extension and M means Mini-project.

## Remember

Throughout the unit, be aware of the reading needs of learners.

You may need to read out parts of the text.

Words **highlighted** in **bold** will need particular clarification.

## Context

- Discuss the scenario in a group.
- Be aware that learners may not drive or own a car.

## Stimulus questions

- Do you drive?
- Do you own a car?
- Have you ever tried to work out how much it costs to run a car?

## Pages 2–5 Who drives?

### Introduction to activity 1

- Find out how many members of the group hold a driving licence. Record the results.
- Do the drivers remember how much it cost to get their licence?
- How many of the learners have the new licence with a photograph?
- Are licences with photographs a good idea?
- Look at the table of results.
- Use a table on a flipchart/board to record how many men and women in the group hold a driving licence.

### Activity 1

- Give learners practice in adding money.
- Ask learners to calculate the cost of a full driving licence.

## Activity 2

- This activity extends the work on fractions, decimals and percentage equivalences introduced at Entry 3.
- When do learners use fractions?
- When do learners use decimals?
- When do learners use percentages?
- Use a flipchart/board to record the results of the discussion.
- Do learners know how to change between decimals to fractions to percentages? Discuss what a fraction means. For example,  $\frac{8}{10}$  = eight out of ten = 8 divided by 10.
- Link the fraction line to the division sign  $\div$ .
- Talk about what happens when numbers are divided by 10 and 100. It may be useful to equate the number of zeroes in 10 000 etc. with the number of places moved.
- Talk about what happens when numbers are multiplied by 10 and 100.
- Go through the worked example.
- Are learners familiar with the words 'numerator' and 'denominator'?
- Ask learners to think of ways to remember which part of the fraction is the numerator and which is the denominator.

## Activity 3

- This activity develops skills in changing percentages into fractions and decimals.
- Learners may need help in understanding how to reduce a fraction to its lowest term.
- Suggest that learners try to divide by 2, then 3 etc.
- It doesn't matter how many steps they go through, as long as the end result is in its lowest form.
- Show different ways of simplifying fractions e.g.  $\frac{45}{60}$  etc. Also use a calculator with a fraction button. Use the expressions 'lowest terms' and 'simplify'. (Avoid using 'cancel'.)
- What happens when you divide a number by 10? by 100?

## Activity 4

- This activity develops skills in changing decimals into fractions.

- Discuss the value of each position of a digit after the decimal point e.g. tenth, hundredth, thousandth.
- Introduce the place value table and show learners how to use it.
- What do zeros in the final columns in the table mean?
- Show the learners that one tenth =  $\frac{1}{10}$ , one hundredth =  $\frac{1}{100}$ , one thousandth =  $\frac{1}{1000}$  and that  $\frac{1}{10} = \frac{10}{100}$  etc.
- Give plenty of practice in finding  $\frac{1}{10}$  – learners will need this skill.
- Remind learners how to reduce fractions to their lowest terms (simplify fractions).

### Activity 5

- This activity develops skills to find the percentage of a number.
- Make sure that learners have the use of a calculator for later examples.
- Discuss as a group where learners see figures given as percentages, e.g. newspapers, magazines, television etc. Record the results and discuss with points on a flipchart or board.
- Make sure that learners can use a basic four-function calculator. Give them time to practise carrying out simple arithmetic operations using the calculator. It is **not** advisable to use a % key even if the calculators have one (these end up being misused).
- Work through the 10% method with learners.
- Work through several other examples of 10%, 20% etc. of an amount.
- Make sure learners understand that 5% is half of 10%.
- What do we mean by a household? Why do some households have two or more cars?
- Ask learners to work in pairs.

**LINKS: H2, E1**

## Pages 6–8

### Does size really matter?

#### Activity 6

**NB: Calculators will not be needed for this activity.**

- Discuss with learners whether engine size affects the price of cars.
- Discuss the measurement of engine size. Engine size can be given as cc or litres. Make sure learners know that 1000 cc is the same as 1 litre.
- Discuss how to work out the order for the prices.
- Look at the place value table. Can learners see how it works? Remind learners that they have used H T U for three-digit numbers. Extending to larger numbers means we need more columns.
- Does the place value table make it easier to compare the numbers?
- Learners may find it easier to carry out this activity in pairs.
- Some learners will benefit from writing each value on a 'Post-it' note before ordering them.

#### Activity 7

- Discuss learners' experience of car insurance. Why do we have it? Is it obligatory? What questions are asked when you are looking for insurance? For example, age, number of years driving licence held, postcode, any previous claims, where the car is kept, convictions for speeding, drink driving etc.
- Use a flipchart or board to record results of the discussion.
- Revise the subtraction techniques covered at Entry 3. How do learners subtract three-digit numbers? Can they extend the technique to larger numbers?
- Demonstrate how to use a calculator to subtract large numbers.
- Make sure learners understand the table of information. For example, can they find the cost for a 30-year-old male?
- Check learners complete the table correctly when transferring information from a chart to a table.

## Activity 8

- Discuss the fact that car tax (formerly known as road fund tax) is paid according to the engine size of the car and the reasons for this, e.g. environmental issues.
- Why would you choose to pay the 12-month rate or the 6-month rate? Use a flipchart or board to record the results of the discussion.
- Discuss the implications of paying tax at the 6-month rate – double the 6-month rate is slightly more than the 12-month single payment.

**LINKS:** H1, E1

## Pages 9–10

### How much will it cost?

#### Introduction to activity 9

**NB: Calculators will be needed for this activity.**

- Most people take out a loan to buy a car.
- Where can you get a loan?
- Discuss where learners have seen advertisements for loans, e.g. newspapers, television, banks, building societies.
- Do you pay more / less / exactly what you borrowed? What about interest?
- Use a flipchart or board to record the results of the discussion.

## Activity 9

- Bring in examples of loan rates from banks, building societies and finance companies. Look at the differences in repayment periods and in rates. Learners may find the tables difficult to read. Talk about getting information from tables. Discuss interest-free loans.
- Work through some examples of percentages with the learners. Use only 50%, 25%, 10% and 5% but stress the various ways of obtaining these, e.g. 25% is half of 50%. Apply 10% + 5% to loans (approximately if necessary).
- Make sure learners understand the terms used: interest, the amount paid and the amount of the loan.

## Activity 10

- Bring in examples of loan rates from local garages. Use them to introduce this activity.
- Discuss the importance of 'telling the story' of a calculation.
- Show how to set out the steps clearly so that the calculation is easy to follow when you look back at it.
- Give learners simple calculations to practise setting out steps.
- Ask learners to identify the numbers to fill in the answer boxes in question 1.
- Ask learners to do questions 2a and 2b individually then discuss the results; 2b is a 0% finance deal. Discuss the benefits of this and any pitfalls.
- Why would learners buy a car from this garage?

**LINKS:** H3, E2

## Pages 11–13

### Percentage rises and falls

#### Activity 11

**NB: Calculators may be needed for this activity.**

- Remind learners of the 10% method (page 5).
- When do learners need to be able to work out percentages?
- Work through the example, making sure that all learners understand the method.
- Stress that, having paid the deposit, they have less to pay, so they subtract the deposit.
- Make sure learners key divisions into calculator correctly.
- Remind learners of how to interpret calculator answers in money.
- Learners should check their answers for the Fiesta before completing the rest of the table.

## Activity 12

- Discuss learners' experiences of percentage increases, e.g. mark up of goods from purchase price to selling price; VAT added at point of sale; wage or pay increase.
- Work through question 1 as a group, stressing that Mick has *added* work so he adds the percentage to the price.

- Ask learners to complete the activity individually or in pairs.

### Activity 13

- Discuss where learners have seen examples of percentage reductions, e.g. sales, special offers etc.
- Stress that the reduction is **subtracted** from the original price.

*LINKS: H3, M3*

## Pages 14–15

### How far is it?

#### Activity 14

**NB: Calculators will not be needed for this activity.**

- Rulers will be needed for this activity.
- Bring in road atlases for learners to look at.
- How many learners have used road maps to estimate the length of journeys?
- What is a scale map? What scales are used? Most road atlases still use a scale of 1 inch to 4 miles.
- Show learners how to use a ruler to measure distances on a map. Emphasise that these measurements are not accurate because roads twist and turn.
- How do we know what the actual distances will be? What does a scale of 1 cm to 2 miles mean? (For every cm on the map, the real distance is 2 miles.)
- What is the scale in the exercise? Work through the example.
- Learners will find it easier to work in pairs for the measuring part of this activity.

#### Activity 15

- Bring in a road distance chart – there is usually one in a road atlas.
- Discuss how it is constructed and how to use it. Ask questions based on distances between places on the chart.
- Learners may find it easier to work in pairs when reading from the chart.

- Some learners will benefit from an L-shaped card for reading the table.

*LINKS: H5, M1, M2*

## Pages 17–20

### Feeding the beast

#### Activity 16

**NB: Calculators will be needed for this activity.**

- Ask learners to estimate their annual mileage to the nearest 1000 miles.
- Discuss how we record petrol consumption. Do learners think of fuel consumption as miles per gallon or miles per litre?
- What does 'per' mean? (For)
- Which is bigger, a gallon or a litre? By about how much? (A gallon is about 4.5 litres.)
- How do we convert from gallons to litres? Introduce the approximate conversion.
- How do we convert from mpg to mpl? (Multiply by 0.22.) Try converting simple rates from mpg to mpl, e.g. 20 mpg and 25 mpg.
- When we multiply by a decimal smaller than 1, the answer is smaller than the original number, so we will do fewer miles per litre than per mile.
- Talk about rounding to one and two decimal places. Always look at the digit in the **next** decimal place, i.e. if rounding to one decimal place, look at the digit in the second decimal place.

#### Activity 17

**NB: Calculators will be needed for this activity.**

- If we know the petrol consumption of a car, how can we work out how much petrol will be used for a given number of miles? Go through the formula to make sure learners understand what is happening.
- Talk about rounding to the nearest whole number. Practise this skill.
- Work through the example.
- Suggest that learners set out their calculations in the same way.
- As the engine size is irrelevant, some learners will benefit from covering this information with card or paper.

## Activity 18

**NB: Calculators will be needed for this activity.**

- Discuss petrol prices at garages and supermarkets. Where is it cheaper?
- Learners are asked to work out the cost of petrol at garage prices. If more practice is needed, repeat the exercise using supermarket prices. Note, however, that learners will probably have difficulty working out the tax at this stage as the % is probably too difficult. (For learners who have grasped 15% as  $10\% + 5\%$ , the supermarket tax can be shown as  $70\% + 5\% + 2.5\%$  and set as extension work.)
- Discuss who pays the tax on petrol and why.
- Do learners know how much tax is paid on petrol?
- Work through the example (pence per litre).
- How is petrol priced at the pump?
- Is the total cost given in pence or pounds?
- How do you change from pence to pounds?
- Remind learners that it is advantageous to be aware of various methods e.g. 25% is easier to calculate as  $\frac{1}{4}$  than using the 10% method.
- Why do we round to two decimal places when dealing with money?
- Were learners surprised at the amount of money that goes to the Inland Revenue?
- Remind learners to look back at the table of average prices.

**LINKS: H4, E3, M3**

## Pages 21–22 Help

### H1

- Encourage learners to work individually for this activity.
- Talk about the cost of servicing and repair. Why do cars need an MOT certificate? What does MOT stand for?
- Make sure learners understand how to use a calculator.

### H2

- Encourage learners to work in pairs for this activity.

- Remind learners how to convert between fractions, decimals and percentages.
- Look at the first row in the table. Work through this row.

### H3

- Encourage learners to work individually on this activity.
- Are learners surprised by the result?

### H4

- Encourage learners to work in pairs on this activity.
- Suggest learners look back to Activity H2 to find fraction and percentage equivalences.
- Talk about how learners will work out how much petrol is in the tank.
- Remind learners to change from pence to pounds when working out the cost of the petrol.

### H5

- Encourage learners to work individually on this activity.
- Revise how to read a distance chart and do some examples.
- Discuss the distance unit.

## Page 23 Extension

Encourage learners to work individually on these activities.

### ↑ E1

- Check the techniques in 'Percentage rises and falls' (pages 11–13).
- Learners should choose which method they use to do questions 2–4.

### ↑ E2

- Check the techniques in 'Who drives?' (pages 2–5).

## E3

- Identify your region.
- Check the techniques in 'Feeding the beast' (Pages 17–20).

## Page 24

### Mini-projects

- Encourage learners to work individually or in groups in class or at home.
- The mini-projects offer an opportunity to apply the skills learnt in the unit.

### M1

- If learners do not have access to ICT, provide copies of *The Insiders Guide to Driving a Car* or *The Insiders Guide to Driving a Motor Cycle* from the AA website ([www.theaa.com](http://www.theaa.com)).
- If learners are car owners, they could calculate the annual cost of running their own cars.

### M2

- This project requires learners to survey local garages and supermarkets, and collect and analyse information about petrol prices.

### M3

- Learners will need newspapers and advertising literature about breakdown services. *Which?* reports may be available.
- Details are available on the breakdown services' websites.

## Pages 25–26

### Check it

Use these questions to assess how learners have coped with the skills in this unit. Ask learners to indicate the areas in which they would like more help.

### *How am I doing?*

Learners should complete this individually, with teacher support.