

Teaching and Learning
Move On with your learners – numeracy

Module 6

Money, formulae and consolidation

Session plan

Module 6: Money, formulae and consolidation

Group: _____

Teacher: _____

Location: _____

Aims

- To explore money conversion and formulae.
- To examine individual priorities and skills gaps.
- To conduct one-to-one progress reviews.

Outcomes

Participants will be able to:

- calculate with sums of money and convert between currencies
- understand and use given formulae, and rearrange formulae
- identify personal priorities and remaining skills gaps, relate these to the Adult Numeracy Core Curriculum at Level 2, and review against individual targets.

Activity and time	Teacher activity	Learner activity
Introduction 5 mins	<ul style="list-style-type: none"> ● Recap on last session. ● Remind participants of the priorities for this session identified last week. ● Use module 6 presentation slides 1–3 to outline the session's aims and objectives. 	<ul style="list-style-type: none"> ● Listen and respond.
Rearranging formulae 30 mins	<ul style="list-style-type: none"> ● Distribute Rearranging formulae handout and Formulae cards – one set per group. ● Explain task and support activity. ● Group feedback. ● Circulate Sample test questions on formulae for completion during individual activity. 	<ul style="list-style-type: none"> ● Small group work. ● Participate in activity. ● Contribute to discussion.

Activity and time	Teacher activity	Learner activity
Money conversion 30 mins	<ul style="list-style-type: none"> ● Distribute copies of Buying and selling rates and define terms. ● Display the currency web site (www.xe.com) to compare today's currency rates with those printed on page 2 of Buying and selling rates; use Q and A to establish prior knowledge. ● Go through example on page 1 with the whole group. ● Explain the 'Holiday shopping' activity – see teacher notes. 	<ul style="list-style-type: none"> ● Listen and respond. ● Contribute to activity.
Individual activities and one-to-one individual review 25 mins	<ul style="list-style-type: none"> ● Set individual/extension activities. ● Begin one-to-one individual progress reviews. 	<ul style="list-style-type: none"> ● Individual work using the computer-based and paper-based resources provided. ● Individual tutorials.
Break 15 mins		
Individual activities and one-to-one individual review 60 mins	<ul style="list-style-type: none"> ● Continue one-to-one progress reviews. 	<ul style="list-style-type: none"> ● Individual work using the computer-based and paper-based resources provided. ● Individual tutorials.
Summary 15 mins	<ul style="list-style-type: none"> ● Revisit session aims and objectives. ● Take feedback and questions and ensure that participants are clear about the individual independent learning tasks to complete before next session. ● Give out Journal sheet for module 6. 	<ul style="list-style-type: none"> ● Listen and respond. ● Agree individual independent learning tasks.

Resources/aids

- Module 6 PowerPoint presentation/OHP slides
- Handouts: Rearranging formulae; Sample test questions on formulae; Journal
- Activity sheets: Formulae cards
- Supplementary materials: PCs or laptops with internet connection; formulae cards; real items for 'shopping' labelled with prices in foreign currency; real foreign currency, or home printed 'pretend' currency; buying and selling rates; copies of the *Adult Numeracy Core Curriculum*
- Whiteboard or flipchart.

Assessment evaluation

Individual learning planning

Learner	Skills	Activity/ Resources	Evaluation (where next?)

Teacher's notes

Module 6: Money, formulae and consolidation

Introduction

Remind participants of the priorities for this session identified last week, at the half way point of the programme. Explain that much of the focus of this week is to identify those areas of the curriculum covered so far where individuals feel that they need further support, and to provide an opportunity to review progress against the original learning goals on their individual learning plans.

Note: The pilot group identified rearranging formulae as a topic because colleagues who had progressed onto the Level 3 Subject Specialist qualification course had identified this as a problem area for them, and the majority of this group shared the Level 3 Subject Support as a progression goal. Currency conversion was a common gap at diagnostic assessment. All modules will need to be adapted to meet the needs of the group, but the content of this module in particular will be dictated by the audience.

Rearranging formulae

Before the session you will need to prepare a set of cards for each group, using the **Formulae cards** activity sheet.

Supply participants with a copy of the **Rearranging formulae** handout, and one set of the formulae cards per group. Introduce the topic, ensuring that everyone is familiar with the vocabulary. Ask them to form the equation in the example from the cards, and then follow the instructions in the boxes. Discuss each movement with the group and aim to achieve C as the subject.

Now ask them to try to form other equations using cards they haven't previously used, and rearrange them to make other equations with either F or C as the subject. They could challenge each other by setting problems (within the available cards) for others to rearrange.

Money conversion

Introduce **Buying and selling rates** (from members.aol.com/twittwoo/msspdfs/MSS1L2-1currency.pdf or via www.skillsworkshop.org) and ensure that everyone understands the terms. Why is the buying rate always more than the selling rate? Explore prior knowledge of exchange rates and variable currency values, and use www.ex.com to compare today's currency rates with the table shown on page 2

of Buying and selling rates. Work through the example given as a group, and ask participants to answer the four questions during their individual work later in the session.

‘Holiday shopping’ activity

Provide a variety of readily available and inexpensive items that people may need to buy whilst on holiday abroad, such as suntan cream, flip-flops, insect repellent, magazines, sunglasses, postcards, fruit and vegetables. Use real coins and money where possible – you could ask work colleagues and the participants to lend you any spare foreign currency for this session – or produce some home-printed ‘foreign’ currency if this proves too difficult. Any currency will do, but it is likely that euros will be the most common currency that participants will have. The shopping items should be labelled beforehand with realistic prices in the foreign currency. Run this as a group activity, with people taking different roles, as buyer and seller, and everyone converting the ‘local’ to ‘home’ prices to compare costs and value for money.

Individual activities and one-to-one progress review


Time will be needed before the onset of one-to-one reviews to ensure that everyone is clear about the curriculum areas they want to work on further, and is supplied with appropriate learning and assessment material. To support this, the participants in the pilot were provided with PCs with internet connection and CD drives, and support was given in signposting them to the relevant sections of the Key Skills Trainer via the Move On web site Learner Route, and/or a selection of commercially available resources at Level 2 on CD-ROM and hard copy. Participants were also provided with copies of all the review pages from the numeracy practice tests at Level 2 to enable them to identify appropriate test questions for practice and assessment.

The one-to-one reviews were then run in parallel to the individual activity, and participants were encouraged to use peer learning strategies to overcome any issues or difficulties arising. This was an opportunity for focused formative assessment and to track progress toward individual learning goals identified in the ILP. In a tightly packed programme such as this, and within a blended delivery model of teacher-led input combined with independent learning, the half-way stage seemed the ideal point to assess progress, identify areas where further work was needed, to agree next steps and model good practice approaches to formative assessment and review. The review process is also an occasion to discuss whether it is more appropriate for participants to be entered for the test at Level 1 or Level 2, and to establish whether any special requirements need to be requested from the awarding body.

Summary

Review the aims and objectives of the session, and prompt discussion on the outcomes of the individual reviews. Establish that everyone is clear about their individually negotiated learning targets and the content of the remaining four modules.


Module 6 PowerPoint presentation



The National Certificate in Adult Numeracy

Level 2 Skills for Life Support Strategies

Module 6:
Money, formulae and progress review




department for
education and skills
creating opportunity, releasing potential, achieving excellence

Aims

- ➔ To explore money conversion and formulae.
- ➔ To examine individual priorities and skills gaps.
- ➔ To conduct one-to-one progress reviews.

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Outcomes

Participants will be able to:

- ➔ calculate with sums of money and convert between currencies
- ➔ understand and use given formulae, and rearrange formulae
- ➔ identify personal priorities and remaining skills gaps, relate these to the Adult Numeracy Core Curriculum at Level 2, and review against individual targets.

3



Handout: Rearranging formulae

‘Make x the subject of the formula.’

‘Transpose x.’

Both of these instructions mean the same thing: you have to rearrange an equation or formula so that $x = \dots$. The single x must be on the ‘left-hand side’. You can transpose any symbol (not just x) in an equation or formula to make it the subject.

Example

Rearrange the formula:

$$F = \frac{9C}{5} + 32 \text{ to make } C \text{ the subject}$$

Subtract 32 from both sides.

Multiply both sides by 5.

Divide both sides by 9.

Rewrite starting with new subject.

Remember

The same method applies to rearranging formulae as solving equations, i.e. you can ‘do’ anything you like to one side of the formula as long as you ‘do’ exactly the same to the other side as well.

Activity: Formulae cards

()
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F	-	+
9	÷	×
C	_____	
32	5	=

Handout: Sample test questions on formulae

- 1 The cost of printing tickets for a play is £4.85 for each 100 tickets plus a fixed charge of £21.50. Which of these is the best estimate of the cost of printing 500 tickets?
- A $5 + 5 + 20$
- B $20 + (5 \times 5)$
- C $(20 + 5) \times 5$
- D $5 \times 5 \times 20$
- 2 The table summarises the income and costs incurred when presenting a play.

Item	£
Printing costs (tickets, posters, programmes)	95
Cost of hire of hall (rehearsals and performances)	125
Cost of hiring lights and costumes	310
Refreshment sales	42
Refreshment costs	18
Ticket sales	1840

Which of these calculations gives the overall profit?

- A $\pounds(95 + 125 + 310 + 18 - 1840 - 42)$
- B $\pounds(95 + 125 + 310 + 18) - (1840 + 42)$
- C $\pounds(1840 + 42 - 95 + 125 + 310 + 18)$
- D $\pounds(1840 + 42) - (95 + 125 + 310 + 18)$

Questions 3 and 4 are about a window cleaner.

The window cleaner needs some leaflets to advertise his business. The printer gives him the following list of costs:

	Cost
Basic setting up charge	£10
First 500 leaflets	£5 per 100 leaflets
Extra leaflets above 500	£2.50 per 100 leaflets

- 3 Which formula shows the cost of printing 1000 leaflets?
- A cost in pounds = $10 + (2.5 \times 10)$
- B cost in pounds = $10 + (2.5 \times 5) + (5 \times 5)$
- C cost in pounds = $10 + (5 \times 10)$
- D cost in pounds = $10 + (7.5 \times 10)$
- 4 The window cleaner can afford to spend £30 on printing. How many leaflets can he get for this?
- A 400
- B 600
- C 700
- D 800
- 5 Anne's food intake should contain no more than 1250 calories per day. The table shows the number of calories in different foods.

Food	Quantity	Calories
Banana	25 g	20
Marmalade	25 g	66
Muesli	25 g	94
Toast	Slice	55
Milk	100 ml	47
Orange Juice	100 ml	46
Tea (no sugar)	Any	0
Sugar	Level teaspoon	17

For breakfast she has 50 grams of muesli and a cup of tea. She uses a total of 150 ml of milk and 2 level teaspoons of sugar. She wants to know what this is as a percentage of her maximum daily calorie intake. Which of these calculations shows this?

- A $\frac{(94 \times 2) + (47 \times 1.5) + (17 \times 2)}{1250} \times 100$
- B $\frac{1250}{(94 \times 2) + (47 \times 1.5) + (17 \times 2)} \times 100$
- C $\frac{94 + 47 + 17}{1250} \times 100$
- D $\frac{250}{94 + 47 + 17} \times 100$

- 6** A gardener buys a 20 kilogram bag of fertiliser. The label states that the recommended coverage is two kilograms per square metre. She uses the fertiliser on a garden border that is 1.5 metres wide.

Which calculation shows the length of border she can cover using one bag?

- A** $20 - (2 + 1.5)$
- B** $(20 \div 2) \div 1.5$
- C** $(20 \div 2) \times 1.5$
- D** $(20 \div 1.5) \times 2$
- 7** Andrew needs to apply wood preservative to one side of his garden fence. One tin of preservative covers four square metres. The instructions state two coats must be applied. The fence is 7.1 m long and 1.8 m high. Which of these calculations is the most accurate estimate for the number of tins Andrew used?
- A** $(2 + 7) \times 2 \div 4 = 4\frac{1}{2}$ tins
- B** $2 \times 2 \times 7 \div 4 = 7$ tins
- C** $(2 + 7 + 2 + 7) \times 2 \div 4 = 9$ tins
- D** $2 \times 7 \div 2 \times 4 = 28$ tins

Questions 8 and 9 are about the accounts at a sports shop.

The table shows a three-month summary of receipts and payments for the sports shop.

	Cash flow (£000s)			
	July	August	September	Total
Receipts				
Cash from sales	120.3	40.5	75.2	236.0
Other income	9.2	4.2	5.0	18.4
Totals	129.5	44.7	80.2	254.4
Payments				
Materials from suppliers	50.6	27.0	70.4	148.0
Wages and salaries	13.4	15.0	13.6	42.0
Overheads	23.0	11.0	12.0	46.0
Capital expenditure	5.0	8.0	2.0	15.0
Totals	92.0	61.0	98.0	251.0

- 8 Which of these methods are checks for the total receipts for three months?

Method 1 $254.4 - 18.4 = 236.0$

Method 2 $92.0 + 61.0 + 98.0 = 237.0$

Method 3 $120.3 + 40.5 + 75.2 = 236.0$

Method 4 $254.4 - 129.5 - 44.7 = 80.2$

- A** Methods 1 and 2
B Methods 2 and 3
C Methods 3 and 4
D Methods 1 and 4
- 9 Under 'Payments', what level of accuracy has been used in the figures for 'Materials from suppliers'?
- A** nearest 10p
B nearest £1
C nearest £100
D nearest £1000

Questions 10 and 11 are about temperatures.

To convert degrees Celsius ($^{\circ}\text{C}$) to degrees Fahrenheit ($^{\circ}\text{F}$), a weather forecaster uses this formula:

$$C = \frac{(F - 32)}{9} \times 5$$

- 10 The temperature in Brighton is 82 degrees Fahrenheit. What is the temperature in degrees Celsius, to the nearest degree?
- A** 1.3 $^{\circ}\text{C}$
B 20 $^{\circ}\text{C}$
C 25 $^{\circ}\text{C}$
D 28 $^{\circ}\text{C}$
- 11 The temperature in Moscow is -4 degrees Fahrenheit. What is the temperature in degrees Celsius?
- A** 20 $^{\circ}\text{C}$
B 15 $^{\circ}\text{C}$
C -15 $^{\circ}\text{C}$
D -20 $^{\circ}\text{C}$

- 12** The electrical plug on Paul's vacuum cleaner has a fuse in its plug. The fuse will blow and stop electricity flowing if more current is used than the fuse's rating. It is best to have a fuse with a rating just above the current being used, to provide maximum protection for the cleaner.

Electricity in the UK is supplied at 240 volts.

The power that an appliance uses is calculated using this formula:

Current (in amps) \times Voltage (in volts) = Power (in Watts)

Paul's vacuum cleaner requires 2750 Watts of power. What fuse should Paul use to best protect his cleaner?

- A** 5 amp
 - B** 10 amp
 - C** 12 amp
 - D** 15 amp
- 13** Chris buys four CDs at £13.99 each. He gives the cashier £60. Which method would give Chris the closest estimate to let him check his change?
- A** $60 - 13 \times 4$
 - B** $60 - 4 - 13$
 - C** $60 - 4 + 14$
 - D** $60 - 4 \times 14$

Use the information below for questions 14, 15 and 16.

In a car hire firm, they work out the cost of hiring a car by using the formula

$$C = 32D + 0.15M$$

Where C is short for the hire cost in £s, D is the number of days hire and M is the distance travelled in miles. They also have to be able to change distances from miles to kilometres for customers from abroad, using the rule '5 miles is approximately 8 kilometres'.

- 14** The distance from London to Birmingham is 105 miles. Approximately what is this distance in kilometres?
- A** 21 km
 - B** 65.6 km
 - C** 168 km
 - D** 840 km

- 15** Peter hired a car to drive from London to Birmingham (105 miles) and then back to London. How much did it cost Peter to hire a car and complete the return journey in the same day?
- A** £31.50
B £35.15
C £47.75
D £63.50
- 16** A week later Peter hired another car for three days' travel to the north of England. The total cost was £171. How far did he travel?
- A** 185.4 miles
B 500 miles
C 926 miles
D 1140 miles
- 17** A car uses 1 litre of petrol to travel 14.8 kilometres. A group of friends are travelling to a campsite 88 kilometres away from their home town. They estimate how much fuel they will need for the trip there and back.

Which of these four attempts gives the closest estimate of the fuel required?

- A** $90 \div 15 = 6$ litres
B $90 \div 10 = 9$ litres
C $180 \div 15 = 12$ litres
D $180 \div 10 = 18$ litres

Use the information below for questions 18, 19 and 20.

The cost of hiring a floor sander is shown below.

Floor sander hire

£12 basic charge plus
£18 per day

- 18** What is the cost of hiring the floor sander for four days?
- A** £60
B £72
C £84
D £120

19 A customer has £120. What is the longest time she can hire the sander for?

A three days

B five days

C six days

D seven days

20 Which formula shows the cost of hiring the sander for n days?

A cost in £ = $12 + 18 + n$

B cost in £ = $12 + 18n$

C cost in £ = $12n + 18$

D cost in £ = 12

Answers: Sample test questions on formulae

1 B

2 D

3 B

4 A

5 A

6 B

7 B

8 D

9 C

10 D

11 D

12 C

13 D

14 C

15 C

16 B

17 C

18 C

19 C

20 B

Journal

Module 6: Money, formulae and consolidation

What have you learnt from this module?

How will you apply skills/strategies learnt with learners within your organisation?

