Travelling in the UK - Functional Maths practice

Name _____ Date _____

You will need: pen, pencil, ruler, graph or squared paper, protractor and a set of compasses (or a computer with a graphics package). You can use a calculator. You must show all your working out.

A survey was taken at *Northarbour to find out how far staff travel to work and how they get there.

Staff Initial	Distance travelled	Transport
NG	6.5 miles	Car
LT	3 miles	Bus
FH	15 miles	Car
JC	2 miles	Bicycle
CB	8 miles	Motorbike
NE	1.5 miles	Free Bus
TH	8.5 miles	Train
CR	3.2 miles	Bicycle
RD	2.5 miles	Free Bus
BS	10 miles	Car
KL	7.5 miles	Bus
LC	12 miles	Motorbike
JS	6 miles	Car
PW	1.5 miles	Walk

Use the information above to create a **tally chart** for mode of transport Do this **neatly** on squared paper; it may be used for a display!

Use the information in your tally chart to draw a **bar chart** below it. Remember to label it correctly!

Below your **transport** chart you need to write the most common form of transport. Comment on this.

EXTENSION TASK

Now draw a pie chart showing the other information from the data chart – the distance travelled. Discuss your ideas for grouping the data with your lecturer before you start.

Below your **distance** chart write the mean distance travelled to work (to 1 decimal place) and the range of distances. Comment on this.

*Northarbour Centre is part of Highbury College, Portsmouth.

Kindly contributed by Nikki Gilbey, Highbury College. Search for N ikki on skillsworkshop.org
March 2011. Covers many aspects of E3-L2 Adult Numeracy and Functional Mathematics (number, measure and data).
For related resources and further curriculum links visit the resource description page at www.skillsworkshop.org

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Using a distance chart

Name _____ Date _____

															London
														Aberdeen	537
													Birmingham	430	117
												Bristol	85	511	119
											Cambridge	178	101	468	60
										Cardiff	213	45	107	532	155
									Edinburgh	393	337	373	293	127	401
								Fishguard	398	113	319	120	177	524	260
							Glasgow	398	45	393	349	372	291	149	400
						Holyhead	321	163	327	209	246	232	155	459	264
					Liverpool	106	221	167	225	200	205	178	98	361	210
				Manchester	34	125	214	189	218	188	153	167	88	354	197
			Newcastle	141	170	250	150	328	109	311	228	291	198	236	276
		Oxford	253	154	165	212	355	214	362	109	80	74	63	498	56
	Penzance	265	477	358	370	409	563	340	567	232	368	195	278	690	312
Stranraer	576	371	164	226	236	334	88	411	133	406	361	386	304	244	414
Stratford	335	264	48	226	116	124	173	319	194	324	99	99	75	24	461	95

- UK Towns and Cities Distance Chart
- Distances are shown in miles.

Travelling in the UK - Functional Maths practice

Name _____ Date _____

Use the distance chart to answer the following questions.

1. What is the distance between Stratford and London?
2. How far is it from Glasgow to Cambridge?
3. What is the distance from Manchester to Holyhead?
4. Which two cities are closest together?
5. Which two cities are furthest apart?
6. If I travel from Cardiff to Birmingham, then on to Oxford, how far do I travel?

CHARITY BIKE RIDE

Two friends, Tori and Jack have decided to each complete a charity bike ride. Tori has chosen the "Northern Challenge" and Jack the "England to Wales Velo-Trial".

NORTHERN CHALLENGE
Charity Bike Ride
Starting on the 15th May in Aberdeen.
Leg 1 – Aberdeen to Edinburgh
Leg 2 – Edinburgh to Newcastle
Leg 3 – Newcastle to Liverpool

ENGLAND TO WALES VELO-TRIAL
Bike ride for charity.
Starts on the 20th May in London
Leg 1 – London to Cambridge
Leg 2 – Cambridge to Birmingham
Leg 3 – Birmingham to Bristol
Leg 4 – Bristol to Cardiff

Use the distance chart to work out how far each leg is, and the total distance of each ride.

Jack has been sponsored 15p per mile by 8 people, and Tori 10p per mile by 12 people.
How much money does each person raise?

Teaching Notes

I created this resource as practice in data handling for a L1 Functional Maths group.

The students are 16-18, and have a limited knowledge of Geography, so I included an outline map of the UK and got them to use a road map to find and mark the cities and towns that are on the distance chart. This made the lesson have a more 'useful feel' as they often question how lessons fit in with their own lives so hopefully it improved their knowledge of their own country.

We also looked at the road map and the distance chart in there and discussed where they live/have been/places of interest/distances across the country etc.

Nikki Gilbey

ANSWERS

Distance Chart

1. 95 miles
2. 349 miles
3. 125 miles
4. Birmingham and Stratford (24 miles)
5. Penzance and Aberdeen (690 miles)
6. 107 + 63 = 170 miles

Northern Challenge

Aberdeen – Edinburgh 127 miles
Edinburgh – Newcastle 109 miles
Newcastle – Liverpool 170 miles
TOTAL – 406 miles

England to Wales Velo Trial

London – Cambridge 60 miles
Cambridge – Birmingham 101 miles
Birmingham – Bristol 85 miles
Bristol to Cardiff 45 miles
TOTAL – 291 miles

Jack raises 291 x .15 = £43.65 x 8 = £349.20
Tori raises 406 x .10 = £40.60 x 12 = £487.20

Comments can be any sensible statement or comparison. E.g. comparing the use of cars / bikes / buses at Northarbour to the student's own college; suggesting that modes of transport will depend on the situation of a college, how good local public transport is; that the survey might only be quite a small sample of staff; that use of bikes / motorbikes / walking might increase in the summer, etc.

Creation of a pie chart will be quite challenging as student will have to group times into categories first . E.g. 1-5 miles, 6-10 miles, 11-15 miles (other groups are acceptable).

Adult Numeracy

This resource covers many aspects of the adult numeracy curriculum (whole numbers, distance, data handling, etc.).

For related resources, teaching ideas, and further curriculum links visit the resource description page at www.skillsworkshop.org

Mobile Phone Functional Maths

Teaching notes | Answers | Functional Maths mapping

Functional Mathematics

This resource is ideal for underpinning many Functional Maths coverage and range statements – at Entry 3, Level 1 and Level 2 (see highlighted areas of the table below). However, in Functional Maths exams it is the process skills that are assessed; these are key to successful Functional Maths teaching and learning and must always be developed and stressed during teaching (see page 6).

Coverage and Range statements (indicative only)

Coverage and range statements provide an indication of the type of mathematical content candidates are expected to apply in functional contexts. Relevant content can also be drawn from equivalent National Curriculum levels & Adult Numeracy standards.

Level 2

- understand and use positive and negative numbers of any size in practical contexts
- carry out calculations with numbers of any size in practical contexts, to a given number of decimal places
- understand, use and calculate ratio and proportion, including problems involving scale
- understand and use equivalences between fractions, decimals and percentages
- understand and use simple formulae and equations involving one or two operations
- recognise and use 2D representations of 3D objects
- find area, perimeter and volume of common shapes
- use, convert and calculate using metric and, where appropriate, imperial measures
- collect and represent discrete and continuous data, using information and communication technology (ICT) where appropriate
- use and interpret statistical measures, tables and diagrams, for discrete and continuous data, using ICT where appropriate.
- use statistical methods to investigate situations
- use probability to assess the likelihood of an outcome

Level 1

- understand and use whole numbers and understand negative numbers in practical contexts
- add, subtract, multiply and divide whole numbers using a range of strategies
- understand and use equivalences between common fractions, decimals and percentages
- add and subtract decimals up to two decimal places
- solve simple problems involving ratio, where one number is a multiple of the other
- use simple formulae expressed in words for one- or two-step operations
- use data to assess the likelihood of an outcome
- solve problems requiring calculation, with common measures, including money, time, length, weight, capacity & temperature
- convert units of measure in the same system
- work out areas and perimeters in practical situations
- construct geometric diagrams, models and shapes
- extract and interpret information from tables, diagrams, charts and graphs
- collect and record discrete data and organise and represent information in different ways
- find mean and range

Entry 3

- add and subtract using three-digit numbers
- solve practical problems involving multiplication and division by 2, 3, 4, 5 and 10
- round to the nearest 10 or 100
- understand and use simple fractions
- understand, estimate, measure and compare length, capacity, weight and temperature
- understand decimals to two decimal places in practical contexts
- recognise and describe number patterns
- complete simple calculations involving money and measures
- recognise and name simple 2D and 3D shapes and their properties
- use metric units in everyday situations
- extract, use and compare information from lists, tables, simple charts and simple graphs

References: Ofqual (2009), *Functional Skills criteria for Mathematics: Entry 1, Entry 2, Entry 3, level 1 and level 2.* http://www.ofqual.gov.uk/files/2009-11-functional-skills-criteria-for-mathematics.pdf
Further functional skills documents available at http://www.ofqual.gov.uk/

Process Skills (all levels)		
Representing – selecting the mathematics and information to model a situation	**Analysing** – processing and using mathematics	**Interpreting** – interpreting and communicating the results of the analysis
Skill Standards (Level 2)		
• understand routine and non-routine problems in familiar and unfamiliar contexts and situations • identify the situation or problems and identify the mathematical methods needed to solve them • choose from a range of mathematics to find solutions	• apply a range of mathematics to find solutions • use appropriate checking procedures and evaluate their effectiveness at each stage	• interpret and communicate solutions to multistage practical problems in familiar and unfamiliar contexts and situations • draw conclusions and provide mathematical justifications
Skill Standards (Level 1)		
• understand practical problems in familiar and unfamiliar contexts and situations, some of which are non-routine • identify and obtain necessary information to tackle the problem • select mathematics in an organised way to find solutions	• apply mathematics in an organised way to find solutions to straightforward practical problems for different purposes • use appropriate checking procedures at each stage	• interpret and communicate solutions to practical problems, drawing simple conclusions and giving explanations
Skill Standards (Entry 3)		
• understand practical problems in familiar contexts and situations • begin to develop own strategies for solving simple problems • select mathematics to obtain answers to simple given practical problems that are clear and routine	• apply mathematics to obtain answers to simple given practical problems that are clear and routine • use simple checking procedures	• interpret and communicate solutions to practical problems in familiar contexts and situations

Ideas for developing maths process skills

R = representing, A = analysing, I = interpreting

Encourage students to:

- highlight information they need, cross out unneeded information **R**
- show all their working out (note that calculators are permitted at all levels of FM assessment but learners should get into the habit of recording their calculations) **R**
- check all their calculations or procedures and show proof that they have done so **RA**
- draw conclusions **I**
- discuss and justify their choice of method and their answers **RAI**
- explain their answers and conclusions to others – verbally and in writing **I**
- investigate other options / situations (e.g. some question topics could be researched on the web) **RAI**
- create new questions about given information and try them out on other students **RAI**
- mark each other's work **RAI**