MATHS TASTER ACTIVITIES: HANDLING DATA

Age range: 8 – 14 years

Outline

Learners will explore some of the ways in which well-being is quantitatively measured. They will ask and answer questions about a set of tabulated data for the UK and the four Young Lives countries: Ethiopia, India, Peru and Viet Nam. Younger or less able learners will then explore the use of infographics to represent percentages. Older or more able learners will discuss and reflect on different ways to describe the data and generate their own statements about the information being shown.

Learning objectives	**Learning outcomes**
• To know some ways in which well-being is quantitatively measured. • To interpret data, and represent and describe it in different ways. • To understand that per cent (%) relates to the 'number of parts per hundred'.	• Learners will interpret a set of data measuring well-being. • Learners will ask and answer questions, and generate statements about a set of data. • Learners will use infographics to represent percentage data.

Key questions	**Resources**

• How can we measure well-being?
• What does this data tell us?
• What questions could we ask about this data? What would the answers be?
• Why might people want to represent or describe data in different ways?
	• Slideshow: slides 2–5, 8-16
	• Resource sheets:
	  1) Measuring well-being
	  2) Describe it in a different way (Completed statements)
	• Activity sheets:
	  1) Which is which?
	  2) Show me the data
	  3) Describe it in a different way

Curriculum links

| **England**
Pupils should be taught to:
KS2 Mathematics
Number – fractions (including decimals and percentages)
• Recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal.
Statistics
• Interpret and construct bar charts, pictograms, tables, pie charts and line graphs and use these to solve problems.
• Complete, read and interpret information in tables, including timetables.
KS3 Mathematics
Number
• Use a calculator and other technologies to calculate results accurately and then interpret them appropriately.
Ratio, proportion and rates of change
• Express one quantity as a fraction of another.
• Understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction. | **Wales**
KS2 Mathematics
Number
• Use fractions and percentages to estimate, describe and compare proportions of a whole.
Handling Data
• Use and present data in a variety of ways including tables, pictograms, charts, bar charts, line graphs, diagrams, text and ICT.
• Collect, represent, analyse and interpret data.
KS3 Mathematics
Developing numerical reasoning
• Interpret mathematical information; draw inferences from graphs, diagrams and data, including discussion on limitations of data.
Using number skills
• Use equivalence of fractions, decimals, percentages and ratio to compare proportions.
• Calculate a percentage, fraction, decimal of any quantity with a calculator where appropriate. | **Scotland**
Numeracy and Mathematics: Number and measure / Data and analysis
• I have investigated the everyday contexts in which simple fractions, percentages or decimal fractions are used and can carry out the necessary calculations to solve related problems.
MNU 2-07a/ MNU 1-20b
Mathematics and Numeracy
• I can choose the most appropriate form of fractions, decimal fractions and percentages to use when making calculations mentally, in written form or using technology, then use my solutions to make comparisons, decisions and choices.
MNU 3 and 4-07a
• I can solve problems involving fractions and mixed numbers in context, using addition, subtraction or multiplication.
MTH 4-07b |

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Activity 1 *(25 min)*

Measuring well-being

- Use slides 3 and 4 of the slideshow to briefly introduce learners to the Young Lives project.

- Show the world map on slide 5. Ask learners if they can locate the UK and the four Young Lives countries (Ethiopia, India, Peru and Viet Nam) on the world map. Click forward on the slide to reveal the locations of these countries.

- Show slide 9 and ask learners: *What do we need to do well in life?* Depending on their existing knowledge and understanding, you may need to spend some additional time discussing what we mean by well-being. You may need to prompt learners by providing some examples such as being healthy or having enough food to eat.

  o *Think: Ask learners to think about the question on their own for about a minute.*

  o *Pair: Give learners a couple of minutes to compare their ideas.*

  o *Share: Spend a few minutes sharing some learners' suggestions as a whole group. You might like to record their ideas on the board.*

- Show slide 10 and explain that these are some examples of the indicators which are used by governments around the world to measure the "well-being" of people in their country. Explanations of the indicators are provided in the slide notes.

- *Optional: Use the quiz questions in slides 11 to 14 to develop learners' knowledge and understanding of some of these indicators and their values.*

- Ask learners whether they think that these indicators are the best way to measure "well-being". *Do you think that other types of data should be collected to measure how "well" people are doing?* Draw out that there are many different ways of measuring "well-being" and that people don't always agree on this. A variety of other indicators are also used such as the Happy Planet Index which takes into account factors such as how happy people feel about their lives and their ecological footprint. Find out more: happyplanetindex.org/

- Distribute copies of *Measuring well-being* (Resource sheet 1). This table includes selected data from each of the four Young Lives countries (Ethiopia, India, Peru and Viet Nam) and the UK. A copy of this table is also provided on slide 15.

- Say that this data is calculated by the World Bank, an organisation which lends money to different countries in order to support economic growth and development; for example major infrastructure projects or education programmes. The World Bank also uses data like this to work out how "well" a country is doing. Support learners to understand the meanings of the different indicators in the table.

- Ask learners to look at the *Measuring well-being* table. Ask them some questions about the data, such as:

  o *What is the life expectancy for people in Peru?*

  o *What percentage of the population in Ethiopia has access to electricity?*

  o *What is the difference between the number of internet users per 100 people in the UK compared to the number in India?*

  o *Which country has the lowest life expectancy?*

- Ask learners to work in pairs to create their own questions about the data. Allow time for learners to share their questions and to try and answer the questions of others.

Activity 2 *(25 min) Activity for younger or less able learners*

Picturing data

- *Note: The idea for this activity comes from the book* If the World Were a Village *by David J Smith and Shelagh Armstrong (A & C Publishers Ltd; 2Rev Ed edition ISBN-13 978-0713668803). Published in 2004, this book explains facts about the global population by representing the world as a village of just 100 people.*

- Display the *Measuring well-being* table again (Resource sheet 1 and slide 15). Ask learners if it is easy or difficult to understand. Discuss other ways in which the data could be presented, for example by using a bar or pie chart.

- Tell learners that the sum of the populations of Ethiopia, India, Peru, Viet Nam and the UK combined is 1,530 million. Ask learners to imagine that all of these people were represented by a village of 100 residents. Show slide 16 and explain that the diagram on this slide shows what this village would be like. Explain that we call this an infographic. An infographic is a diagram which represents some data or information visually. Ask learners which they think is easier to understand: data shown in a table, or data in an infographic like this.

- Say that we could also use infographics to represent other indicators. Explain that some of the indicators in the table are measured as a percentage which means the number of people in every hundred.

- Now give learners copies of *Which is which*? (Activity sheet 1). Explain that this activity sheet uses similar infographics to represent some of the country data from the *Measuring well-being* table. Ask learners to use the table to work out which country is being represented in each diagram.

- *Answers: A = Ethiopia, B = India, C = Viet Nam, D = India*

- Now give each learner a copy of *Show me the data* (Activity sheet 2). Ask learners to use other indicators expressed as percentages from the *Measuring well-being* table to create their own infographics. If they have indicators expressed as decimals, ask them to first round their numbers to the nearest whole number.

Activity 3 *(45 min) Activity for older or more able learners*

Describe it in a different way

- Point out that the data in the *Measuring well-being* table could be described in different ways.

- Organise learners into pairs and give each pair a copy of *Measuring well-being* (Resource sheet 1) and *Describe it in a different way* (Activity sheet 3). Explain that the ten statements in *Describe it in a different way* were all calculated using the data in *Measuring well-being*. Ask learners to use this data to complete the missing part of each statement. The correct answers are provided in *Describe it in a different way – Completed statements* (Resource sheet 2).

- Allow time for learners to share and discuss their answers, using the following questions as prompts:

- o *Did any of the statements surprise you? If so, which statements and why?*
- o *Do you think it makes people react differently if data is described in a different way? Explain your answer.*
- o *Why might people want to describe data in different ways?*
- o *What other statements could you calculate using the data in the* Measuring well-being *table?*

- Ask learners to use the data in the *Measuring well-being* table to generate their own set of statements.

- Allow time at the end of the activity for learners to discuss any similarities and differences they noticed between the countries in terms of the different development indicators. You could ask the following questions:
  - o *What similarities and differences are there in the development data for these countries?*
  - o *Which development indicators vary the most between these countries?*
  - o *What do you think are the reasons for these inequalities?*

Further ideas

- With younger or less able learners, try other activities from Oxfam's *Everyone Counts* maths resource for 8 to 12 year olds:

  www.oxfam.org.uk/education/resources/everyone-counts

- With older or more able learners*,* try other activities from Oxfam's *More or Less Equal?* maths resources for 11 to 16 year olds:

  www.oxfam.org.uk/education/resources/more-or-less-equal-maths

- Explore different ways of representing information visually using dried pulses, sticky notes or beads.

- Use the internet to research other well-being and development indicators. Useful websites include:
  - o World Bank Open Data: data.worldbank.org
  - o UN Data: data.un.org

- Investigate other ways of presenting this data, for example using pie charts or bar charts.

Terms of use

Measuring well-being

Resource sheet 1

Indicator	Ethiopia	India	Peru	Viet Nam	UK
Population (millions)	97	1,295	31	91	65
Life expectancy at birth (years)	64	66	75	76	81
GDP per capita (current US$)	565	1,596	6,551	2,052	45,603
Infant mortality rate (per 1,000 live births)	41	38	13	17	4
Access to improved water source (% of total population)	57	94	87	98	100
Access to improved sanitation facilities (% of total population)	28	40	76	78	99
Access to electricity (% of total population)	27	79	91	99	100
Mobile phone subscriptions (per 100 people)	32	74	103	147	124
Internet users (per 100 people)	3	18	40	48	92
Rural population (% of total population)	81	68	22	67	18
Urban population (% of total population)	19	32	78	33	82
Primary school enrolment (% of relevant age group)	65	93	92	98	100
Living in extreme poverty (% of total population)	34	21	4	3	No data

Data rounded to the nearest whole number.

Data source: *World Bank Open Data*: data.worldbank.org

Data collected from 2006 to 2015.
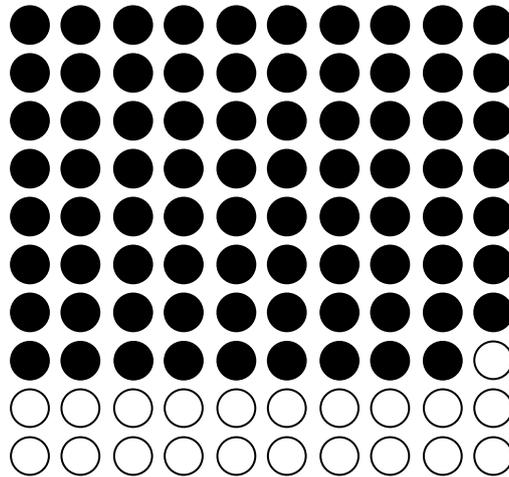
Which is which?

Activity sheet 1

Look at the infographics below. Can you work out which country is being shown in each one? Use the *Measuring well-being* table to help you.
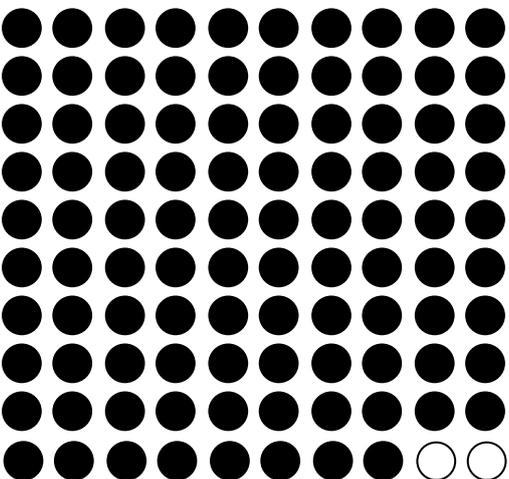
A. Has access to water
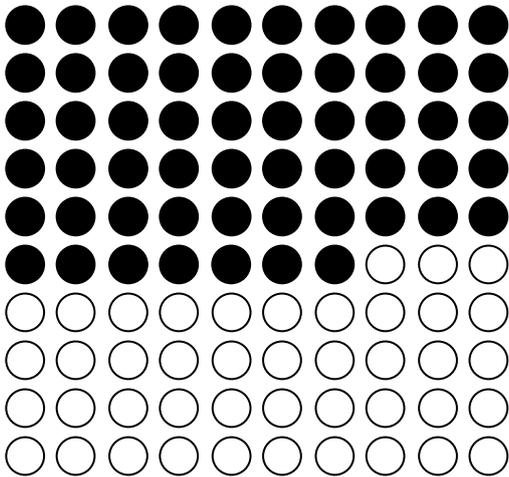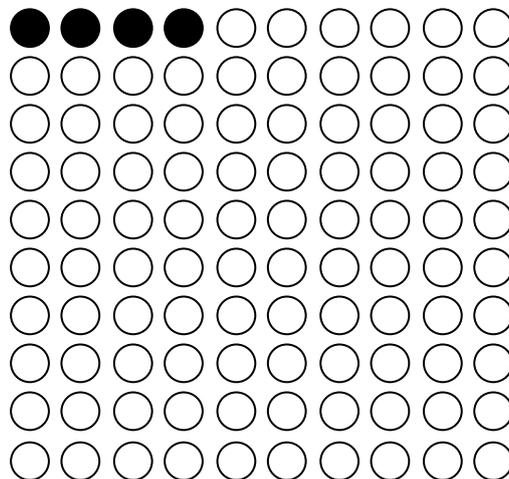

Country: _____

B. Has access to electricity

Country: _____

C. Enrolled in primary school

Country: _____

D. Lives in extreme poverty
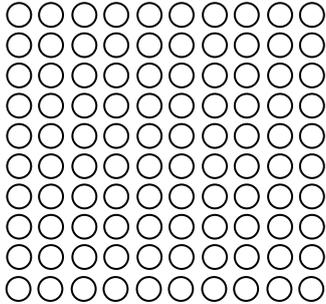

Country: _____

Key

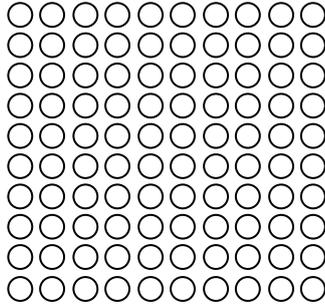● Yes   ○ No

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Show me the data

Activity sheet 2

Choose one of the indicators from the table. Represent the data by colouring in the diagrams below.
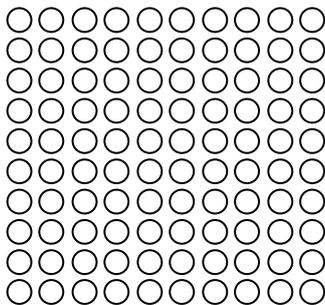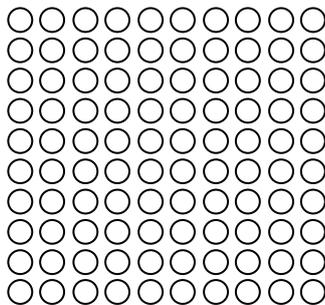
Indicator: _____

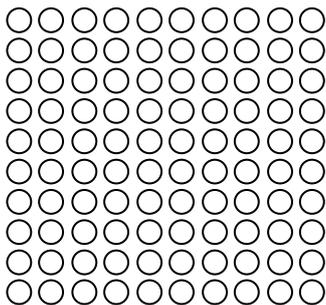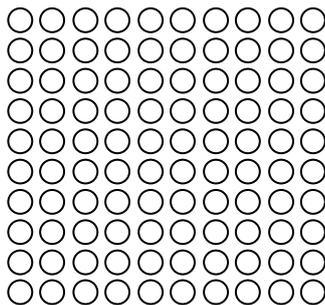**Ethiopia**   **India**   **Peru**
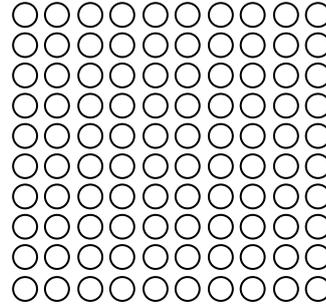
Vietnam   **UK**

Key
◯ **Yes**   ◯ **No**

Indicator: _____

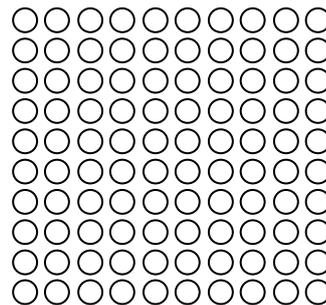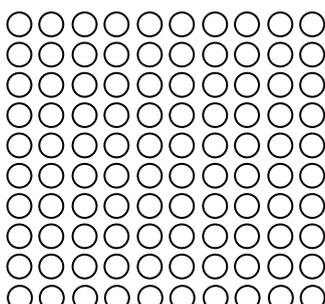**Ethiopia**   **India**   **Peru**
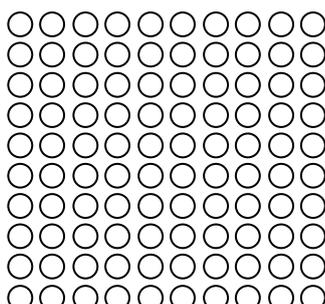
Vietnam   **UK**

Key
◯ **Yes**   ◯ **No**

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Describe it in a different way   **Activity sheet 3**

Complete the missing part of each statement using data in the *Measuring wellbeing* table.

1) The population of India is approximately _____ times the population of the UK.

2) A child born in Peru today is currently expected to live _____ years longer than a child born in Ethiopia today.

3) _____ fifths of the population of India have access to improved sanitation facilities.

4) _____% of children in Ethiopia (to the nearest whole number) die before their first birthday.

5) _____% of the population of Ethiopia doesn't have access to electricity.

6) To the nearest million, _____ million people in Ethiopia don't have access to an improved water source.

7) GDP per capita in the UK is roughly _____ times GDP per capita in Viet Nam.

8) There are _____ times as many internet users per 100 people in Viet Nam as there are per 100 people in Ethiopia.

9) Roughly _____ out of every five people in the UK lives in a rural area.

10) Approximately _____ million people in India are living in extreme poverty.

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Describe it in a different way (completed statements)   Resource sheet 2

Complete the missing part of each statement using data in the *Measuring well-being table.*

1) The population of India is approximately ___*20*___ times the population of the UK.

2) A child born in Peru today is currently expected to live ___*11*___ years longer than a child born in Ethiopia today.

3) __*Two*_ fifths of the population of India have access to improved sanitation facilities.

4) ___*4*___% of children in Ethiopia (to the nearest whole number) die before their first birthday.

5) ___*73*___% of the population of Ethiopia doesn't have access to electricity.

6) To the nearest million, ___*42*___ million people in Ethiopia don't have access to an improved water source.

7) GDP per capita in the UK is roughly ___*22*___ times GDP per capita in Viet Nam.

8) There are ___*16*___ times as many internet users per 100 people in Viet Nam as there are per 100 people in Ethiopia.

9) Roughly __*one*__ out of every five people in the UK lives in a rural area.

10) Approximately __*272*__ million people in India are living in extreme poverty.

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