UNIT 3: THE POWER OF DATA

Age range: 9 - 13 years

Outline
In this unit, learners will create simple infographics which raise awareness of some of the inequalities that exist between people's lives. Learners will first consider how and why governments and organisations use data to make decisions when planning for the future. They will investigate some ways in which "well-being" is quantitatively measured and consider questions about data from the four Young Lives countries, as well as the UK. Learners will then discuss what inequality means and how it can exist both between and within countries. They will explore how organisations, such as Oxfam, use infographics to raise awareness of inequality, before going on to create infographics of their own.

Learning objectives
- To develop skills in using software to create an infographic.
- To be aware of some "well-being" data that governments, organisations and communities use to plan for the future.
- To know what inequality means and recognise some of the inequalities that exist between and within the Young Lives countries and the UK.

Learning outcomes
- Learners will create simple infographics which raise awareness of some of the inequalities that exist between people's lives.
- Learners will consider some measures of "well-being" that governments, organisations and communities use to plan for the future.
- Learners will explore "well-being" data from the Young Lives countries and the UK.

Key questions
- What data do you think might be useful to governments and organisations when planning for the future?
- What does inequality mean?
- What inequalities exist between and within countries?
- How and why might organisations use infographics to present data?
- What infographic could you create to raise awareness of the inequalities which exist between countries?

Resources
- *Data power* slideshow: slides 33 to41
- Resource sheet: *1. Measuring well-being*
- Activity sheet: *1. Planning your infographic*
- Spreadsheet: *Measuring well-being*

Curriculum links

England
Pupils should be taught to:
KS2 Computing
- Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information.

KS3 Computing
- Undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users.

Wales
Numeracy Framework
- Using data skills: collect and record data, present and analyse.

Digital Competencies Frameworks
- Data and information literacy - explore and analyse data sets.

Scotland
ICT to Enhance Learning
- I can create, capture and manipulate sounds, text and images to communicate experiences, ideas and information in creative and engaging ways.
  TCH 1-04b / TCH 2-04b
- I enhance my learning by applying my ICT skills in different learning contexts across the curriculum.
  TCH 3-04a

Important teaching note
These are suggested activities and resources to support your teaching rather than guide it. Additional teaching input may be required to develop learners' knowledge, skills and understanding of some of these concepts. It is assumed that teachers will choose to spread the activities in a unit over more than one lesson.

Activity 3.1 *(30 min+)*

Measuring well-being

Note: Ideally learners will have access to a computer or tablet for this activity.

- Ask learners to think back to Activity 2.2 *(Sharing out the money)* where they had to decide how best to spend a community's money. *What data do you think might be useful to governments, organisations and community leaders when planning for the future?*
- Use slides 34 and 35 to provide examples of some different indicators which governments, communities and organisations around the world use to measure the "well-being" of people in a country or community. Explanations of the indicators are provided in the slide notes. Explain that this data also helps governments and organisations to decide which areas to allocate more money and resources to.
- 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/
- Explain that governments also use data to set targets for development and monitor progress towards these. Show slide 36 and explain that in September 2015, country leaders came together to agree some "Sustainable Development Goals" (SDGs). The SDGs are a set of goals for the world that aim to make our planet fair, healthy and sustainable by 2030. Governments will use data to help them to measure progress on the SDGs every year, with the aim of achieving all the goals by 2030.
- Organise learners into pairs. Each pair should have access to a computer or tablet and a copy of the spreadsheet: *Measuring well-being*. Explain that this table includes selected data from each of the four Young Lives countries (Ethiopia, India, Peru and Viet Nam) and the UK. If computer access is unavailable, you could distribute copies of *Measuring well-being* (Resource sheet 1). The table is also provided on slide 37.
- Explain that this data is calculated by the World Bank, an organisation which lends money to different countries to support their economic growth and development. For example, it might provide money for major infrastructure projects or education programmes. The World Bank uses data like that shown in the *Measuring well-being* table to work out how "well" a country is doing.
- Ask learners to look at the *Measuring well-being* table. Ask them questions about the data. Possible questions are provided in the notes of slide 37.
- Ask learners to work in pairs to come up with their own questions about the data. Allow time for learners to share their questions and try to answer the questions of others. More able learners could use formulae to compare the data, for example to subtract the value in one cell from another.

Activity 3.2 *(45 min+)*

Raising awareness

Note: Ideally learners will have access to a computer or tablet for this activity. It is also anticipated that the teacher will already have some basic graphic design and digital media knowledge. If in doubt, designing a model infographic is recommended.

- Ask learners to look again at the data in the *Measuring well-being* table. Discuss the following questions:
  - *Which well-being indicator do you think is the most important?*
  - *Which part of this data do you think more people should be aware of?*
  - *Why do you think this?*
- Point out that the data in this table shows some of the inequalities that exist in people's lives, both between and within countries. Show slide 38 and use the information in the notes to explain what inequality means and how it can exist both between and within countries.
- Show slide 39 and use the information in the notes to draw out that there are many ways in which inequality can affect peoples' lives.
- Explain that organisations such as Oxfam use data to try and raise awareness of the inequalities which exist between people. They work with others to put pressure on decision makers and people in power to change the structures and policies that contribute towards these inequalities.
- Say that one way in which Oxfam and other organisations raise awareness is by creating and sharing infographics. Explain that an infographic is a way of visually representing information. Infographics are eye-catching designs that combine images, patterns, diagrams, charts and text to make information stand out and be easier to understand. Infographics are usually designed to tell a story to a specific audience and therefore their design is very important.
- Show slide 40 and ask learners what they think this infographic is showing. *What data is being shown? What message do you think Oxfam is trying to get across?*
- Explain that in early 2016, Oxfam calculated that the world's richest 62 people owned the same wealth as the poorest half of the world's population. Discuss how learners feel about this statistic. *Do you think it is fair? Why or why not?*
- Say that Oxfam raised awareness of this inequality by creating simple infographics and posters such as the one shown on this slide. Ask learners to look at the infographic and discuss what they think is effective about it and what could be improved. Possible discussion questions are provided in the notes of slide 40.
- You may wish to also discuss the simple infographics on slide 41. Explain that these are other infographics that Oxfam has used in the past to raise awareness of issues such as climate change and inequality.
- Organise learners into pairs or groups of three. Ask them to select the "well-being indicator" in the *Measuring well-being* table that they feel is the most important to raise awareness about. Learners could use data from just one country, for example only 27% of people living in Ethiopia have access to electricity. Alternatively they could use data from two or more countries to highlight the inequality that exists between these countries, for example CO_2 emissions per person in the UK are nearly four times that in India.

- Give each pair or group a copy of *Planning your infographic* (Activity sheet 1). Ask learners to use these questions to help them to plan what their infographic will be like.
- Support learners to then create their infographics. There are many infographic tools and software available online including:
    - Adobe Photoshop CC: www.adobe.com/uk/products/photoshop.html
    - Datawrapper: datawrapper.de
    - Infogr.am: infogr.am
    - Piktochart: piktochart.com
    - Google Charts: developers.google.com/chart/
    - Easelly: www.easel.ly/
    - Venngage: venngage.com/

  Note: The above infographic tools and software are not the property of Oxfam and Young Lives, and Oxfam and Young Lives are not affiliated with any of these organisations for the purposes of this resource. Any views expressed on these websites, or by these organisations, do not necessarily reflect the views of Oxfam and Young Lives. Oxfam and Young Lives do not endorse any of these tools or software.
- If access to a computer or tablet is not available learners could create their infographics by hand using paper and coloured pencils or pens.
- Allow time at the end of the activity for learners to share and evaluate their infographics with others in the class. Encourage them to think about the questions they used to evaluate Oxfam's infographics.
- Finally, discuss how learners could share their infographics with others in their school or wider community to raise awareness of inequality. If you have time, support your learners to plan, carry out and evaluate their own awareness-raising activity or activities. Possible suggestions include:
    - *Embedding infographics in a web page or blog post.*
    - *Combining infographics to create a video, slideshow or animation.*
    - *Creating digital or printed posters for display around the school.*
    - *Creating a slideshow of infographics and/or data visualisation from previous sessions for peer teaching with another class, or to deliver as an assembly.*
    - *Arranging a meeting with their local MP to share their learning and encourage the Government to take action on inequality.*

Differentiation

- *Make it easier: Learners could create a simple infographic to represent the value of one "well-being indicator" from just one or two of the countries.*
- *Make it harder:*
    - *Learners could create infographics which represent a larger data set, for example data for more than one of the indicators and/or data comparing all five countries.*

- *More able learners could find out about the differences between bitmap and vector images. Infographics are typically vector which means that they can be scaled to lots of different media, from a smartphone display to the side of a bus. For a brief explanation of the differences between bitmap and vector images, see:* www.youtube.com/watch?v=u3BI3DTQgrk (Credit: VectorzMedia, published 13th Feb 2015).

Further ideas

- More able learners could investigate other indicators which governments and organisations use to make decisions and plan for the future. Possible data sources include:
  - data.worldbank.org
  - hdr.undp.org/en/data
  - www.wolframalpha.com/

  Ask learners to look out for instances where the data is missing for some countries. Discuss possible reasons for this, such as a lack of funding and resources in poorer countries to collect the data, or where countries have been affected by conflict or disaster. Ask learners why a lack of reliable data might make it difficult for governments and organisations to make effective decisions and improve people's lives. You might like to use the analogy of how a pupil being regularly absent could make it more difficult for their teacher(s) to assess and support the pupil's learning effectively.
- More able learners could use the Gapminder website (www.gapminder.org) to investigate how the values of some of these "well-being indicators" have changed over time and how the indicators vary in different countries and regions of the world.
- Learners could carry out Activity 2.2 (*Sharing out the money*) again but this time base their decisions on the "well-being" data from one of the Young Lives countries or the UK. Different groups could be allocated different countries. At the end of the activity, ask the groups to share their distributions and discuss how they used the data to inform their decision-making.
- Learners could explore a set of graphics that have been created to illustrate progress that has been made towards the Millennium Development Goals. Explain that these goals were set by world leaders in 2000. These targets ended in 2015 and were replaced by the Sustainable Development Goals (introduced to learners in *Activity 3.1*).
  - www.un.org/millenniumgoals/multimedia.shtml#prettyPhoto
- Learners could use the internet to search for other infographics used by governments, organisations, individuals and the media to visualise information. One possible starting point is David McCandless's website: www.informationisbeautiful.net/
- Older learners could try activities from Oxfam's *The Art of Inequality*. This art and design resource for 11-14 year olds supports learners to analyse infographics and apply design principles in Adobe Photoshop to create their own striking visual representations of inequality.
  - www.oxfam.org.uk/education/resources/the-art-of-inequality
- Try activities from Oxfam's *Everyone Counts* maths resources for 8-12 year olds or More or Less Equal? maths resources for 11-16 year olds. These resources use the Young Lives data to help learners to develop their skills and understanding of topics such as time and data handling.

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

Terms of use

Measuring well-being

Resource sheet 1

Indicator	Ethiopia	India	Peru	Viet Nam	UK
Average income per person (US$)	619	1,582	6,122	2,111	43,734
Life expectancy (years)	64	68	75	76	81
Access to water (% of total population)	57	94	87	98	100
Primary school enrolment (% of relevant age group)	86	92	93	98	100
Access to electricity (% of total population)	27	79	91	99	100
Infant mortality rate (per 1,000 live births)	41	38	13	17	4
CO_2 emissions (tonnes/person/year)	0.1	1.7	1.9	1.7	6.4
Mobile phone subscriptions (per 100 people)	43	79	110	131	126
Internet users (per 100 people)	12	26	41	53	92
Inequality score	33	35	44	38	33
Living in extreme poverty (% of total population)	34	21	3	3	No data
Population (millions)	99	1311	31	92	65

Data source:

World Bank Open Data: data.worldbank.org/ *(Data used is that most recently available for each indicators, ranging from 2010 – 2015)*

Global Carbon Atlas: www.globalcarbonatlas.org/ *(Data used is that most recently available, ranging from 2013 to 2015)*

Note: Population is rounded to the nearest million. CO_2 emissions are provided to 1 decimal place. All the other data is rounded to the nearest whole number.

Planning your infographic

Activity sheet 1

- What is your infographic about? Which data are you going to use? What message are you trying to get across?

- Who is your infographic aimed at? Is it designed for a particular audience such as young people?

- What do you picture in your head when you think of this data or message?

- What images will you use in your infographic? What size and colour will the images be? How will this image help your audience to visualise the information?

- What colour(s) and font will you use for your text? Will the text all be the same size or will some of the text be bigger? Which text and why?

- What colour(s) will you use for the background?

- If you are comparing data from different countries, what will you do to make the difference (inequality) between the countries stand out?

- How will you make sure your infographic is simple and not too cluttered so that your message is clear?