**Lesson Plan Template**

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| Student Name: |  |
| Date: |  |
| Class: | JC Maths |
| Subject: | Maths |
| Topic of the lesson: | Line graphs and Life expectancy  |
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| Where does this lesson fit in the topic/unit being taught? |
| **JC Maths Strand 1- Statistics and Probability: Lesson 6 in this unit****1.4 Statistical reasoning with an aim to becoming** **a statistically aware consumer:** The use of statistics to gather information from a selection of the population with the intention of making generalisations about the whole population. They consider situations where statistics are misused and learn to evaluate the reliability and quality of data and data sources.**1.6 Representing data graphically and numerically:** Methods of representing data. Students develop a sense that data can convey information and that organising data in different ways can help clarify what the data have to tell us. They see a data set as a whole and so are able to use fractions, quartiles and median to describe the data.Pupils will use **line graphs** to investigate how gross domestic product (GDP) per capita has changed over time in the Ireland and each of the four Young Lives countries (Ethiopia, India, Peru and Vietnam). They will then construct line graphs to show how life expectancy has changed over time in each country. Finally, pupils will interpret and discuss inequality data from these five countries. |
| What prior knowledge do student have about this topic? |
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| Materials used during lesson: |
| By teacher: | By students: |
| Resources:Oxfam: Everyone countshttp://www.oxfam.org.uk/education/resources/everyone-countsUnit 3 Slideshow (Sessions 4 – 6): Slides 16 – 35. Resource sheets: GDP per capita (table and line graphs); Life expectancy (table); Inequality (table and line graph). |  |
| 1. Aims | In this lesson I will… |
| * To interpret data represented in line graphs.
* To construct a line graph for a set of data.
* To know why a line graph is useful for certain types of data.
* To understand how well-being and inequality can be measured in different ways
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| 2. Learning Outcomes | At the end of this lesson, students will be able to…. |
| (outline key ideas/concepts/content/vocabulary, use specific active verbs)* Pupils will interpret and answer questions about line graphs showing how GDP per capita (income per person) and inequality (GINI index) have changed over time in the IRELAND and the four Young Lives countries.
* Pupils will construct a line graph to show how life expectancy has changed over time in the four countries.
* Pupils will discuss differences in GDP per capita, inequality and life expectancy between and within countries.
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| 3. Assessment How will students’ learning progress be assessed? |
| **Key questions*** What does the data tell you?
* Why is a line graph suitable for this data?
* What has happened to ‘income per person’ over time?
* How do the different countries compare?
* What has happened to life expectancy over time?
* What are the reasons for these changes?
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| 4. Opening | How will lesson be introduced? What’s the ‘hook’? |
|  (Try to link to real-world application/ or prior knowledge)Activity (20 min)Show slide 17 of the Unit 3 slideshow and discuss some of the different ways in which people **measure well-being**. If you haven’t done so already, you might like to revisit slides 4 to 13 in the Unit 3 Slideshow (Sessions 1 – 3) which show some of the indicators measured and used by organisations such as the World Bank.Show slide 18 and ask pupils for ideas about **how we can measure how rich or wealthy a country is**. Use slide 19 to explain what GDP per capita means. Explain that an organisation called the World Bank (which lends money to different countries to support economic growth and development) calculates countries’ ‘income’ as a measure of how ‘wealthy’ the country is. To calculate it they add up the total amount of money being made in the country over the year and then divide it by the number of people in the country. They do this calculation in US dollars so that they can compare all countries fairly. This is called GDP per capita. We can just call it ‘income per person’.Show slide 20 and ask pupils to rank the four Young Lives countries and the IRELAND from lowest to highest according to what they think their ‘income per person’ would be. **Discuss their reasons for the rankings they have used**. Slide 21 shows the correct order.Distribute copies of GDP per capita. This shows the data for the IRELAND and the four Young Lives countries in a table and two line graphs. The first line graph shows the data for all five countries; the second line graph shows the data for the four Young lives countries only. The table and colour copies of the line graphs are provided on slides 22 to 24. Which do pupils find easier to read and understand; the table or the line graphs? Discuss why a line graph is suitable for this data. Line graphs are useful for continuous data, such as measuring how a variable changes over a continuous period of time.Develop pupils’ understanding by asking them questions about the data, such as:* Which country was the wealthiest in terms of income per person in 2010?
* Which was the second wealthiest in 2010?
* Which country was the poorest in 2010?
* In which countries is GDP increasing/decreasing?
* What happened to GDP in the IRELAND from 1980 to 1985?
* What is the difference between GDP in Ethiopia in 1985 and 2010?
* What is the difference between GDP in India and Peru in 2010?

**Pupils could answer verbally or record their responses on individual whiteboards. If time allows, ask pairs of pupils to devise their own questions and answers about the data.** | Timing: |
| 5. Body of lesson *(include teaching approaches, when materials are used etc…)* |
| Teacher Activities | Student Activities | Timing: |
| Activity (30 min)Ask pupils what other indicators might be used to measure well-being. Distribute copies of the Life expectancy table. A copy of the table is provided on slide 25. Explain that this table shows how average life expectancy has changed over time in each of the four Young Lives countries and the IRELAND.**Life expectancy**Life expectancy at birth is the number of years a newborn infant would live if the prevailing patterns of mortality at the time of birth were to stay the same throughout his or her life.Discuss what might be an alternative way of presenting the data. Would a line graph be suitable for this data? Why or why not?**Ask pupils to construct a line graph to show how life expectancy changes over time in one, three or all five of these countries. Pupils could use the template provided (Life expectancy Line graph) or construct their own axes.**Ask pupils to devise their own questions about the data for others in the class to answer such as:* What is the difference between life expectancy in Viet Nam in 1965 and 2010?
* Which country had the highest life expectancy in 2010?
* Which country had the lowest life expectancy in 2010?
* Which country showed the greatest increase in life expectancy between 1965 and 2010?
* Which country showed the smallest increase in life expectancy between 1965 and 2010?

**Differentiation**LA: Construct a line graph to show life expectancy for one of the countries. MA: Construct a line graph to show life expectancy for three countries (including the IRELAND). HA: Construct a line graph to show life expectancy for all five countries.**Activity (15 min)**Use slides 26 to 29 to explore what we mean by inequality and how it can exist both between and within countries. These slides are also provided in Unit 1: Session 6 where pupils consider what inequality means and use sharing to show equal and unequal distributions. Remind pupils that inequality isn’t just about how money is shared out between and within countries. It also affects the opportunities that people have.Ask pupils to think again about the data for ‘income per person’ (GDP per capita) and life expectancy. Is there inequality between countries for these measures of well-being? Why are income and life expectancy higher in some countries than in others?Now discuss the pupils’ ideas about whether or not there will be inequality within countries for these well-being indicators. Do you think income and life expectancy will be the same for most people within a country? Why? In which countries do you think income and life expectancy will vary the most? Why do you think this?Show slide 30. Explain to pupils that we can use the GINI index to measure inequality within a country. Countries are given a score between 0 and 1 to show how equal or unequal they are.Show slide 31. A score of 0 would mean that everyone in that country has the same income. In reality no country is like this. You might like to discuss whether it would be fair if everyone earned the same amount of money. If pupils agree, you could ask them if they still think it would be fair if some people work harder than others and so on.Show slide 32. A score of 1.0 would mean that the country is completely unequal; one person has all the income and everyone else has none. Emphasise that no countries are this unequal. Show slide 33 and explain that all countries fall somewhere between 0 and 1.0. The lower the number, the more equal the country is.**GINI Index**This is a measure of how equal or unequal a country is, derived from the distribution of income across the whole society. It was developed by the Italian statistician and sociologist, Corrado Gini. A score of 0 means that income is spread equally between everyone (all people earn the same amount of money); while a score of 1 means the opposite: one person has all the income and everyone else has none. Therefore the GINI index can be seen as a measure of fairness, with a lower score meaning a fairer or more equal society and a higher score meaning a more unfair or unequal society. GINI indices can be calculated in different ways and therefore different sources may give slightly different numbers. Globally, inequality has been increasing over the last 20 years, both between countries and within countries. | Students constructing line graphStudents answering questionsPupil discussion |  |

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| 6. Closing | How will lesson be closed? |
| **Distribute copies of the Inequality table and line graph.** Explain that both the table and line graphs only show selected data for every five years up until 2010. Copies of the table and line graph are provided on slide 34 to 35. The line graph shows the overall changes in inequality from 1980 to 2010. **How has inequality changed over time in each country? Ask pupils to write a sentence or two to describe the data for each country.**According to this data, in which country has inequality risen the most over this time period? **Discuss whether pupils are surprised by the correct answer . What do you think the reasons for this increase might be?** |
| 7. Self Evaluation |
| How did the lesson go?Were learning outcomes achieved? To what extent? |  |
| What would you do differently next time? |  |
| What can you learn from this lesson? |  |
| You might consider areas such as student understanding, motivation, clarity of instruction, student involvement, learners’ ability to transfer new knowledge to different situations, teaching methods, discipline, resources, surprises and/or unexpected student behaviour |