A new point of VIEW

A Financial Justice Ireland resource for Leaving Certificate Applied Mathematical Applications

Irish Aid
An Roinn Gnóthaí Seachtracha
Department of Foreign Affairs
WorldWise Global Schools

FINANCIAL JUSTICE IRELAND

Financial Justice Ireland (originally called Debt and Development Coalition Ireland) is a global financial justice organisation.

We want a fair and just society for everyone. We want a financial system that serves the needs of all people and which does not take the planet for granted. We were set up in 1993 as a response to the debt crisis in the Global South. Since that time, we have continued to lobby and campaign for sovereign debt relief, while examining different ways the structures of the international financial system can perpetuate poverty and inequality.

In 2018, on our 25th anniversary, we changed our name to better reflect our expanded areas of work. As well as working in solidarity with the Global South, we also raise awareness of how these financial issues affect people living in Ireland. Through our Development Education work we critically engage people to understand the structural causes of global inequality and power relations. We aim to empower people in Ireland to take informed action for greater economic justice globally.

To find out more about us and our work, please visit www.financialjustice.ie

This project has been undertaken with funding from Irish Aid's WorldWise Global Schools. Irish Aid's WorldWise Global Schools is the national programme of Global Citizenship Education (GCE) for post-primary schools in Ireland.

It is funded by Irish Aid and implemented by a consortium of organisations: Self Help Africa, Concern Worldwide and the City of Dublin Education and Training Board Curriculum Development Unit. The programme was set up in 2013 as the key channel through which Irish Aid support for GCE in post-primary schools is to be coordinated. Their aim is to increase the number of post-primary schools engaging in quality global citizenship education by providing a broad range of supports.

You can find out more about WorldWise Global Schools and the work they do at www.worldwiseschools.ie

Overview

Published by Financial Justice Ireland in Dublin, 2021.

Acknowledgements

This resource was conceptualised by Éilis Ryan who carried out preliminary stakeholder engagement to assess the LCA landscape and where a resource such as this might best be placed. The maths activities were designed by Aoife Kelly and are based on her resource "We Can Solve It! It was written by Meaghan Carmody. 'A New Point of View' was prepared in consultation with Aoife, who provided guidance on structure and layout, and feedback at all stages of production. Her support is greatly appreciated. We would also like to thank Keith O'Hara who piloted the resource, as well as Teresa Cushen and Tom McGahon who provided their thoughts at the early stages of resource development.

Design and print by www.pixelpress.ie

Ample consultative support from Aoife Kelly is greatly appreciated. We would also like to thank Keith O'Hara who piloted the resource, as well as Teresa Cushen and Tom McGahon who provided their thoughts at the early stages of resource development.

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Background to the resource

Financial Justice Ireland believes that in order to bring about a world free from poverty and inequality we first need a just and sustainable financial system. To achieve and preserve a fair financial system will require the action of informed citizens and governments. Citizens must feel confident in their **understanding** of how the financial system works, and confident that alternatives exist. They must have the **knowledge** and **skills** to take action that will influence the shape of the financial system, and they must be able to **hold decision-makers to account** about the ways the financial system affects their lives, and those of people throughout the world.

Financial Justice Ireland promotes the idea of a fair and equal global society and in particular a financial system that serves the needs of all people rather than favoured groups - a society that doesn't take the planet for granted. With the publication of our Junior Cert resource, 'We Can Solve It' we took the opportunity to link these aims to the teaching and learning of mathematics. With this resource, we aimed to build on this foundation and create a resource specifically targeted at the Leaving Cert Applied Mathematical Applications curriculum.

The formal education sector at LCA level provides an opportunity to incorporate critical financial education in the curriculum and cocurricular activities at a crucial time in the life of the student when they are beginning to understand the nature of the world and their role in transforming it. The development of the student's **interaction** and **engagement** with the world around them is of the utmost importance to us, and we believe that that is reflected in this resource.

Through the use of this resource, students can learn about injustices in the world and be equipped with the knowledge to bring about change which can alleviate social and financial inequalities. We have worked with teachers of LCA Maths in its design, and hope to produce a user-friendly and useful resource using global citizenship approaches and methodologies which will support teachers and students to develop their mathematical skills, while learning more about justice and the global financial system.

Pages 1-12 provide some background and context, while pages 13- act as a workbook.

Connection to LCA mathematical applications

LEAVING CERTIFICATE MATHEMATICAL APPLICATIONS SEEKS TO:

"encourage a positive disposition towards mathematics through the grounding of all activities in concrete contexts and settings that are relevant and recognisable to the students".

In LCA Maths, students are required to turn real life problems into mathematical models, and use mathematics to **investigate** a problem, **analyse** the data collected, draw **conclusions** and **communicate** their reasoned judgment.

This underpins the rationale for the development of a resource published by Financial Justice Ireland. This resource includes **Key Assignments** related to global and financial justice which align with each module descriptor, making it an **easy-to-use** resource for both teachers and students.

LCA Mathematical Applications aims to be **relevant** to the real world. That is why **authentic data** is used in order to generate meaningful, relevant contexts for students to use as they develop their key skills. As a result, students will appreciate the power of mathematics to represent **real-world problems** and give them tools to potentially solve such problems.

It will also raise the **critical awareness** of students around issues such as: quality of life and well-being; environmental sustainability; tax systems; and sovereign debt, while simultaneously cultivating a **sensibility** to local and global injustice and commitment to **collective action**.

Use of this resource supports development of the student's mathematical proficiency while at the same time helping them become more **resourceful, confident, engaged** and **active learners** as they interact with **relevant** and **up-to-date** data that is **meaningful** to them. Upon use of this resource, students will appreciate that mathematics is a powerful tool to interrogate, and potentially solve, meaningful real-world problems.

Curriculum structure & links

In their course of study of Leaving Certificate Applied (LCA) Mathematical Applications, students complete four Modules over two years. This is divided into two modules per academic year. Students are required to complete one Key Assignment per module and to keep a portfolio of work related to each assignment.

THE MODULES ARE AS FOLLOWS:

MODULE 1	Mathematics and Planning
MODULE 2	Mathematics and the World around me
MODULE 3	Mathematics and Life skills
MODULE 4	Mathematics and Work

This resource is structured around the four modules.

LCA Mathematical Applications is a **transdisciplinary** subject. Transdisciplinary learning is not confined by traditional subjects, but is supported and enriched by them. This is evidenced in this resource by the inclusion of technological and linguistic development in each key assignment. This transdisciplinarity makes the engagement with Global Citizenship Education (GCE) all the more appropriate, as the nature of GCE encourages drawing on different skills and subjects in order to arrive at an integrated, holistic understanding of issues of global justice.

Resource structure

The Key Assignment for each module is a case study that may be a stand-alone piece of work, or incorporated into other activities in the module. Each Key Assignment in this resource is structured to align with the suggested learning experience outlined in the syllabus in order to facilitate use for teachers and students.

THE STRUCTURE OF EACH ACTIVITY IS AS FOLLOWS:

- Finding Out
- Collecting/Comparing/Calculating
- Interpreting Results
- Making Judgements
- Communicating my Ideas and Results

Each stage in this cycle of mathematical learning acts as a heading to structure each Key Assignment, ensuring students have focused on each essential component of this approach to mathematical investigation. This is conveyed by Figure 1 below.

On pages 6-7 you will find a table showing you where to find the activity/ies that correspond to the learning outcomes you want to achieve with your students.

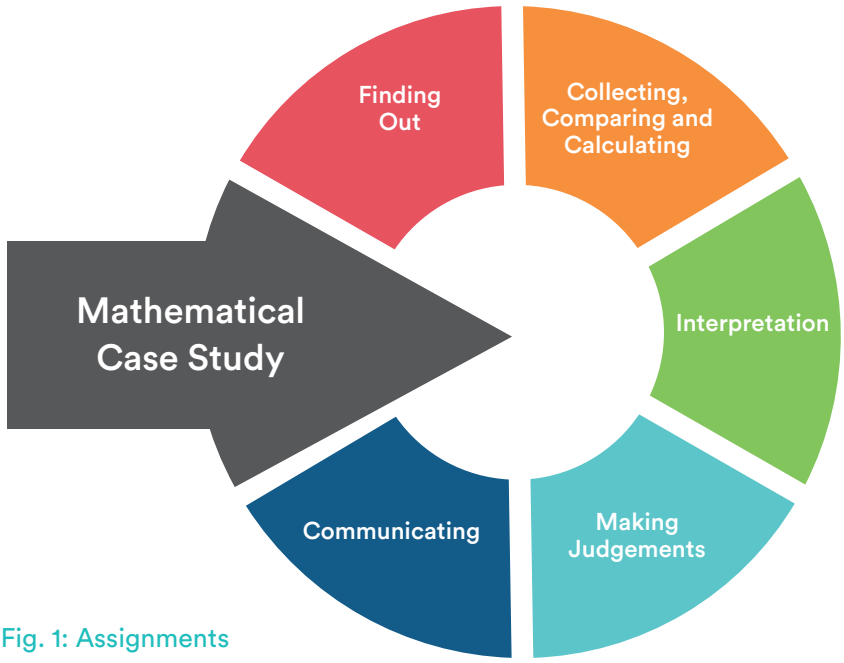


Fig. 1: Assignments

Activity finder

Below are the main learning outcomes which are developed in this section. Please note this list is not exhaustive.

KEY ASSIGNMENT	MODULE	UNIT	LEARNING OUTCOMES	PAGE
1. How happy is my school?	Mathematics and Planning	1: Researching and Planning	1. Conduct market research to gather, source and interpret data. 2. Interpret relevant information communicated in tables/charts or graphs. 3. Present findings and draw conclusions.	09
2: Which are the happiest and unhappiest countries in the world?	Mathematics and Planning	1: Researching and Planning	1. Conduct market research to gather, source and interpret data. 2. Interpret relevant information communicated in tables/charts or graphs. 3. Present findings and draw conclusions.	14
3: Costing solar panels for my School	Mathematics and Planning	2: Budgeting	1. Investigate and cost a leisure, home or work-space for a particular purpose. 2. Prepare a project budget. 3. Research, compare and contrast data about costings. 4. Make 'value for money' judgements and justify judgements with mathematics.	21
4: Plastic, plastic everywhere	Mathematics and the World Around Me	1: Current Affairs	1. Create and interpret opinion polls or surveys. 2. Analyse and interpret relevant information communicated in words/ tables/ charts or graphs. 3. Investigate an issue and use mathematics to communicate findings	26

Activity finder

KEY ASSIGNMENT	MODULE	UNIT	LEARNING OUTCOMES	PAGE
5: Comparing household budgets and the impact of VAT increases on households	Mathematics and Life skills	1: Personal Finance	1. Analyse and interpret data which impacts on personal finance presented in a variety of ways. 2. Communicate findings in words/tables/charts or graphs.	33
6: The Philippines, an unsustainable burden	Mathematics and Work	1. Mathematical Skills and Concepts	1. Analyse and interpret information about income and expenditure represented in words/ equations/tables /graphs or charts.	38
7: Ranking countries by different metrics	Mathematics and Planning	1: Researching and Planning	1. Conduct market research to gather, source and interpret data. 2. Interpret relevant information communicated in tables/ charts or graphs. 3. Present findings and draw conclusions.	47
8: National debt	Mathematics and the World around me	1: Current Affairs	1. Analyse and interpret relevant information including voting data communicated in words/ tables/ charts or graphs. 2. Investigate an issue and use mathematics to communicate findings.	57

Key assignment checklist

MATHEMATICS AND PLANNING

- [ ] I have carried out a case study into a relevant area of mathematics and planning.
- [ ] I have collected and selected the relevant examples from my portfolio of learning to exemplify the following areas of the mathematical case study in my specified area.

MATHEMATICS AND THE WORLD AROUND ME

- [ ] I have carried out a case study into a relevant area of mathematics and the world around me.
- [ ] I have collected and selected the relevant examples from my portfolio of learning to exemplify the following areas of the mathematical case study in my specified area.

MATHEMATICS AND LIFE SKILLS

- [ ] I have carried out a case study into a relevant area of mathematics and life skills.
- [ ] I have collected and selected the relevant examples from my portfolio of learning to exemplify the following areas of the mathematical case study in my specified area

MATHEMATICS AND WORK

- [ ] I have carried out a case study into a relevant area of mathematics and work.
- [ ] I have collected and selected the relevant examples from my portfolio of learning to exemplify the following areas of the mathematical case study in my specified area

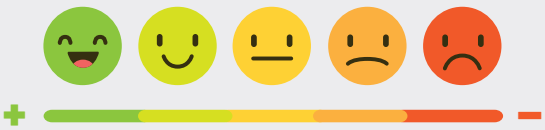
Key assignment 1

How happy is my school?

Finding Out

1. Design a questionnaire to help you get answers to the question "How happy are you in school?"

A scale of 0 – 5 could be used along with emoji faces, for example.



What do you score on the Happiness Scale?

1	Very happy
2	Mostly happy
3	Neither happy nor unhappy
4	Sometimes unhappy
5	Very unhappy

2. Make a plan for taking a random sample of students in your school. You must survey at least 30 students.

3. Describe the steps you will take:

1. _____

2. _____

3. _____

4. _____

5. _____

4. Distribute the questionnaire. This can be done in person, or through an online poll or survey. Some online options include Google Forms and Typeform.

Collecting/Comparing/Calculating

1. Tally the scores from your questionnaire and complete the frequency table below:

Happiness Score	1	2	3	4	5
Tally					
Frequency					

2. Draw a bar chart or line plot to show your data.

3. Analyse your data by finding the:

a. Mean score: _____

b. Mode score: _____

c. Median score: _____

d. What percentage rated themselves as 4 or 5? _____

e. What fraction rated themselves as 1, 2 or 3? _____

Making Judgements

1. Make a list of recommendations for your school based on your research.

1. _____

2. _____

3. _____

4. _____

5. _____

2. Do you think schools are judged to be "good schools" based on how happy the students are? Or are there other ways that schools are judged to be "good schools"? Explain your answer.

3. List ways that you could add to this research in the future.

1. _____

2. _____

3. _____

4. _____

5. _____

Communicating my Ideas and Results

Design a poster showing your findings and display it in your school

OR

Invite a wellbeing professional / counsellor into your class and share your findings with them

Other examples of learning from my portfolio related to this Key Assignment are:

- [ ] I have carried out a case study into a relevant area of mathematics and planning.
- [ ] I have collected and selected the relevant examples from my portfolio of learning to exemplify the following areas of the mathematical case study in my specified area.

Youth mental health organisations you could contact:
Jigsaw
SpunOut

Key assignment 2

Which are the happiest and unhappiest countries in the world?

Finding Out

The following are the top 20 happiest countries in no particular order. Their scores are ranked on a scale of 1 to 10, with 1 being very unhappy and 10 being the most happy.

1. With your partner or a group, rearrange the countries so that they are ranked from the highest to the lowest.

COUNTRY	Happiness score out of 10
Iceland	7.504
Australia	7.223
Canada	7.232
Germany	7.076
Denmark	7.646
Czech Republic	6.911
Belgium	6.864
Israel	7.129
Finland	7.809
Austria	7.294

COUNTRY	Happiness score out of 10
Netherlands	7.449
Costa Rica	7.121
Switzerland	7.560
Luxembourg	7.238
New Zealand	7.300
United Kingdom	7.165
Norway	7.488
United States	6.940
Ireland	7.094
Sweden	7.353

Source: http://worldhappiness.report/ World Happiness Report 2020

The following are the bottom 20 countries in terms of happiness. They are in no particular order. Their scores are ranked on a scale of 1 to 10, with 1 being very unhappy and 10 being the most happy.

2. With your partner or a group, rearrange the countries so that they are ranked from the highest to the lowest.

COUNTRY	Happiness score out of 10
India	3.573
Zambia	3.759
Zimbabwe	3.299
Egypt	4.151
Haiti	3.721
Tanzania	3.476
Malawi	3.538
Afghanistan	2.567
Sierra Leone	3.926
Togo	4.187
Botswana	3.479

COUNTRY	Happiness score out of 10
Lesotho	3.653
South Sudan	2.817
Comoros	4.289
Ethiopia	4.186
Burundi	3.775
Central African Republic	3.476
Yemen	3.527
Madagascar	4.166
Rwanda	3.312

Source: http://worldhappiness.report/ World Happiness Report 2020

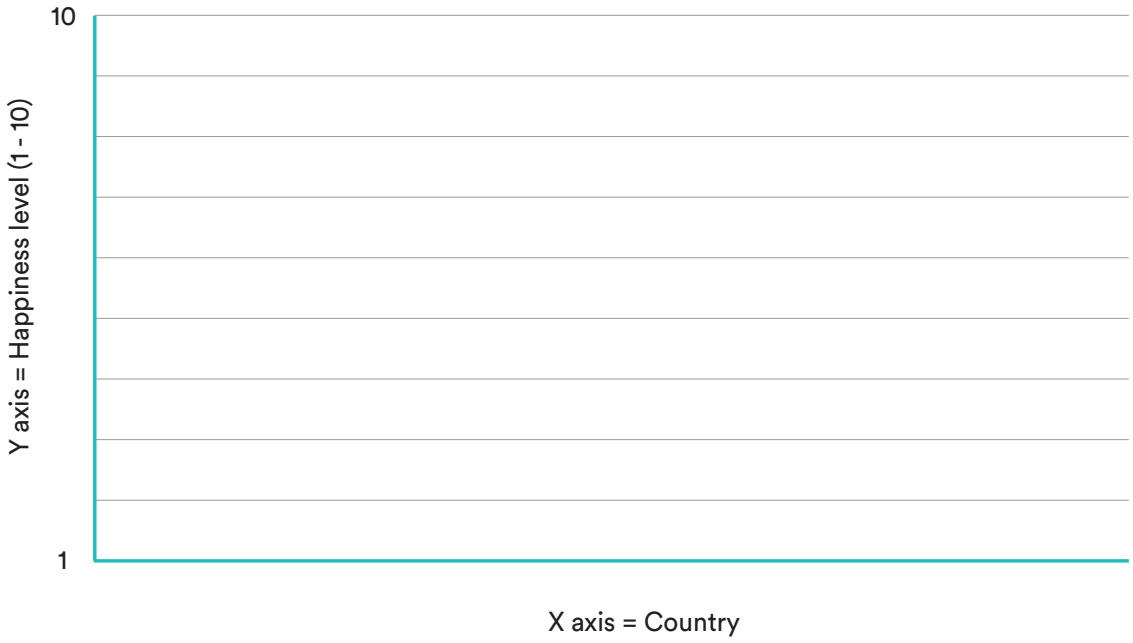
Collecting/Comparing/Calculating

1. Round the top 10 happiest countries scores to the nearest whole number and input the scores into the three columns on the left in the table below.

2. Round the scores of the 10 least happiest countries to the nearest whole number and input the scores into the three columns on the right in the table below.

	COUNTRY	Happiness score	Rounded to nearest whole number	COUNTRY	Happiness score	Rounded to nearest whole number
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

3. On the axes below, draw two sets of bar charts to show the happiness scores for the top 10 countries and the bottom 10 countries.



Interpreting Results

1. Based on the rounded numbers, calculate the mean score of the top 10 countries.

2. Based on the rounded numbers, calculate the mean score of the bottom 10 countries.

	Top 10 happiest countries rounded to the nearest whole number		10 least happiest countries rounded to the nearest whole number	
Mean (complete after your calculations)				

3. List any similarities you see in the countries with the top 10 happiness scores.

4. List any similarities you see in the countries with the bottom 10 happiness scores.

Making Judgements

1. Write down some reasons why you think people in the top 20 countries may be happier than other countries?

2. Why do you think people in the bottom 20 countries may be unhappy? Explain your reasoning.

Communicating my Ideas and Results

Write a news headline to explain what you found in this activity

OR

Write a tweet (280 characters) based on your findings in this activity

Other examples of learning from my portfolio related to this Key Assignment are:

- [ ] I have carried out a case study into a relevant area of mathematics and planning.
- [ ] I have collected and selected the relevant examples from my portfolio of learning to exemplify the following areas of the mathematical case study in my specified area.

Key assignment 3

Costing solar panels for my school

Finding Out

1. Find out what solar panels are, and why they are important.

What solar panels are:

Why are solar panels important?

2. Find out, in basic terms, how a solar panel works and draw or explain below.

3. Explain why solar panels are considered 'environmentally friendly'.

4. Find two companies near your school that install solar panels.

Company A:

Company B:

Collecting/Comparing/Calculating

1. In general, the south-facing side of a building gets more sun. Identify with your partner where the south-facing side of your school's roof is.

2. In pairs, estimate the length and width of the section of the school's roof. Your estimate doesn't need to be exact, look at a metre stick and judge the length and width of the section of the roof to the nearest metre.

Length: _____

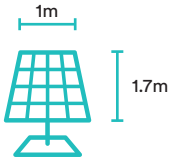
Width: _____

3. Calculate how many solar panels could fit on that section based on the standard measurement of a solar panel.

_____

_____

_____



A typical solar panel measures 1 x 1.7m so has an area of 1.7m^2

4. Contact the two companies you have identified and complete the tables below

Item Quantity	Amount (Company A)	Amount (Company B)
Solar Panel (quantity)	# _____	# _____
Fittings	€ _____	€ _____
Labour	€ _____	€ _____
VAT charges	€ _____	€ _____
Other charges	€ _____	€ _____
Total	€ _____	€ _____

Interpreting Results

1. Compare the two companies by filling out the table with your opinions on the following, given the data you have collected.

NAME	COMPANY A	COMPANY B
Value for Money		
Reliability		
Sustainability		
Suitability		

Making Judgements

1. Based on the table above, make a decision as to which company you would hire for the job. Explain your reasoning.

Communicating my Ideas and Results

Write a letter to your Principal outlining the benefits of solar energy to your school and the environment.

OR

Present your choice of company to your class and explain why you would choose them to be your school's solar panel provider.

OR

Invite a solar panel installer into your class to tell you about their work and the benefits of harnessing solar power.

Other examples of learning from my portfolio related to this Key Assignment are:

- [ ] I have carried out a case study into a relevant area of mathematics and planning.
- [ ] I have collected and selected the relevant examples from my portfolio of learning to exemplify the following areas of the mathematical case study in my specified area.

Key assignment 4

Plastic, plastic everywhere

https://www.theguardian.com/business/2016/jan/19/more-plastic-than-fish-in-the-sea-by-2050-warns-ellen-macarthur

More plastic than fish in the sea by 2050, says Ellen MacArthur

One refuse truck's-worth of plastic is dumped into the sea every minute, and the situation is getting worse.

Finding Out

1. Answer the following questions:

A. How old will you be on today's date in 2050? _____

B. How many tonnes of plastic do you think are made globally each year? Make a prediction, and then find out.

My prediction _____

Actual Figure _____

C. Find out what a tonne of weight is and write an explanation here.

_____

_____

_____

D. Do you think people who were your age in the 1950s used as much plastic as we do today? List some differences and similarities. You can use the internet to help you find out.

Differences:

Similarities:

Collecting/Comparing/Calculating

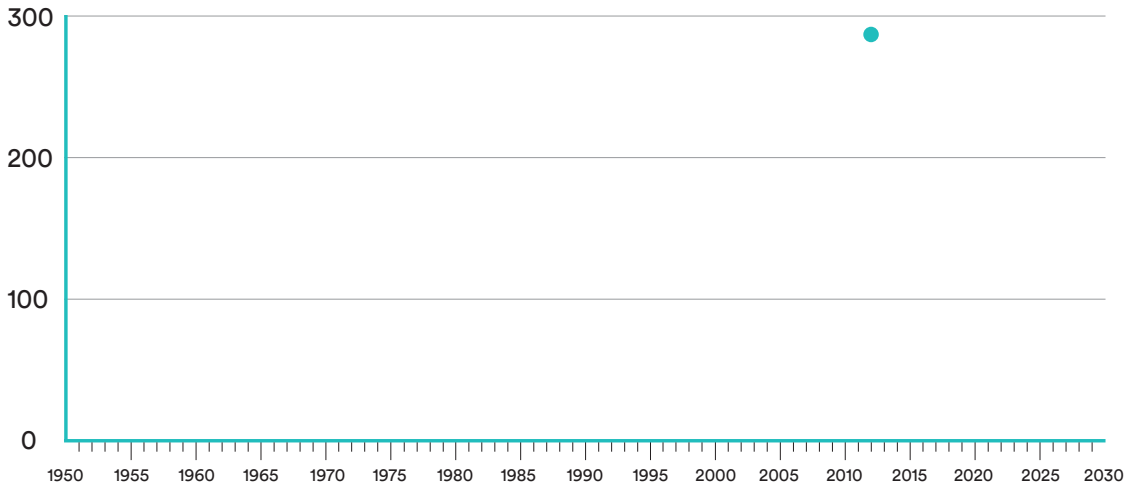
1. Look at the chart below.

YEAR	Million Tonnes of Plastic created (total)
1950	1.7
1976	47
1989	99
1990	80
2002	204
2009	250
2010	270
2011	280
2012	288

https://www.plasticseurope.org/application/files/7815/1689/9295/2013plastics_the_facts_PubOct2013.pdf p.10

2. Draw a graph to show the number of tonnes of plastic created since 1950 until 2012. The last point is plotted for you. It doesn't have to be perfect, just do the best you can.

Tonnes of plastic created since 1950 (in millions)



Interpreting Results

1. What do you notice about the graph, does anything surprise you? Explain your answer.

2. How much did plastic production increase between 1950 and 2012?

a. When did the production of plastic really speed up?

b. Circle the type of relationship exists between plastic production over time

Linear Quadratic Neither

c. If plastic continues to be created at the same rate, use your graph to estimate the amount of plastic that will be created by 2030. Use your best estimate based on the trend you see in the graph.

3. It is estimated that approximately 78 million tonnes of plastic waste is generated each year (Ellen MacArthur Foundation 2016, p.13)
http://www3.weforum.org/docs/WEF_The_New_Plastics_Economy.pdf)

The table below shows where waste ends up, and how much ends up there.

a. Write an explanation of what the words mean and fill in the answers to the table

	Definition	Millions of Tonnes of Waste (MT)	Angle of Sector
Landfill		31	
Leakage		25	
Incineration		11	
Recycled		11	

b. Calculate the angle of the sector for each type of waste disposal and record the answer in the table above. Round your answers to the nearest degree.

c. Draw a pie chart showing the destinations of plastic waste.

4. Complete the multiple choice quiz below. How much did plastic production increase between 1950 and 2012?

Question	Options		
_____ of plastic waste ends up in the environment.	☐ 5%	☐ 10%	☐ 20%
Most plastic waste is recycled.	☐ True	☐ False	
In a pie chart, the angle of the sector _____ is 190 degrees.	☐ Leakage	☐ Incinerated	☐ Landfill
1/____th of plastic waste is incinerated.	☐ 1/10	☐ 1/20	☐ 1/30
___% of all plastic waste is leaked into the sea and land.	☐ 0.01%	☐ 0.1%	☐ 1%

Making Judgements

1. Write down 3 key conclusions you can make from this activity.

1. _____

2. _____

3. _____

2. List 3 ways that people can change their single use plastic habits

1. _____

2. _____

3. _____

Communicating my Ideas and Results

Write a short blog about what you have learnt about plastic production and single use plastic

OR

If your school has devices, create a short video for social media communicating your findings and recommendations

Other examples of learning from my portfolio related to this Key Assignment are:

- [ ] I have carried out a case study into a relevant area of mathematics and planning.
- [ ] I have collected and selected the relevant examples from my portfolio of learning to exemplify the following areas of the mathematical case study in my specified area.

Key assignment 5

Comparing household budgets and the impact of VAT increases on households

Finding Out

1. List as many regular monthly expenses for an average household in Ireland as you can.

- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____

2. Find out what VAT stands for in Ireland.

VAT: V_____ A _____ T _____

3. Explain in your own words what VAT means and find out the current rates in Ireland.

VAT is a tax .....

_____

Current VAT on Goods _____% Current VAT on Services _____ %

4. List two things you could buy that would have VAT included.

1. _____

2. _____

List two services you could use that would include VAT.

1. _____

2. _____

Collecting/Comparing/Calculating

1. (a) The table below shows two household's budgets with two different income levels and different monthly expenses. By calculating the annual expenses, complete the total yearly expenses for both families.

INCOME	€50,000	Income	€100,000	
Per month	Family A	Annual Expenses	Family B	Annual Expenses
Saves	€20 × 12		€500 × 12	
Rent / mortgage	€1,100 × 12		€2,200 × 12	
Electricity and heat	€250 × 12		€225 × 12	
Telephone and internet	€200 × 12		€200 × 12	
Holidays (annual)	€1,500		€3,200	
Food	€ 1300 × 12		€1000 × 12	
Petrol/Diesel	€200 × 12		€80 × 12	
Entertainment	€200 × 12		€ 150 × 12	
Total Annual Expenses.	**€**		**€**	

(b) The Government will be increasing VAT rates by 2%. Calculate the increase that Family A and Family B will pay for the categories below. The first calculations are done for you.

	FAMILY A	FAMILY B
Electricity and Heat @ 2%	2/100 × 3000 =€60	2/100 × 2700 = € 54
Entertainment @ 2%		
Holidays @ 2%		
Petrol/Diesel @ 2%		
Phone and Internet @ 2%		
Food @ 2%		
Total increase in VAT		

Interpreting Results

1. (a) Complete the table to calculate the increased VAT that each family has paid as a percentage of their total income.

Family A	Total Increase in VAT	Total Income	Total Increase VAT ÷ Total Income	(Total Increase VAT ÷ Total Income) x 100
Family B	Total Increase in VAT	Total Income	Total Increase VAT ÷ Total Income	(Total Increase VAT ÷ Total Income) x 100

(b) What conclusions can you draw from your calculations above? Which family pays the bigger increase?

2. Based on what you have found, do you think we have a system that collects VAT In a way that those with a higher income pay more tax than those with a lower income?

3. Do you think this is a 'Just Tax System'? Explain your reasoning.

Communicating my Ideas and Results

Write a few lines for your school newspaper or website on your findings from this assignment.

OR

What 3 points would you give to a newspaper reporter if they asked you if Ireland's current tax system is 'just'?

Other examples of learning from my portfolio related to this Key Assignment are:

- [ ] I have carried out a case study into a relevant area of mathematics and planning.
- [ ] I have collected and selected the relevant examples from my portfolio of learning to exemplify the following areas of the mathematical case study in my specified area.

Key assignment 6

The Philippines, an unsustainable burden

Finding Out

1. In pairs, estimate how much a household in Ireland spends a day (think about rent, mortgage, bills, food etc.)

Rent / mortgage	€
Electricity / gas / energy	€
Food	€
Transport	€
Clothing	€
Communication and internet	€
Other category	€
Other category	€
Total estimated expenses (daily)	€

You can use this space for calculations:

2. Find out today's conversion rate from Euro to US Dollars €1 = $ _____

3. Convert $2 to Euro _____

4. With the same rate, convert the amount an average household in Ireland spends a day to dollars.

Total estimated expenses (daily) € _____

Workings:

Total estimated expenses (daily) $_____

5. Mark the Philippines on the map of the world.

In The Philippines, a high percentage of people live on less than $2 a day. Poverty in the Philippines is more persistent than other countries in South East Asia, with one in five people living below the national poverty line. The country is vulnerable to natural disasters, relies heavily on farming and has a very high population growth rate. These factors are contributing to the poverty levels.

6. Think about two things you would like to know about The Philippines, and then find the answer.

What I want to find out:	Answer:

Collecting/Comparing/Calculating

1. Find out the population of the Philippines _____

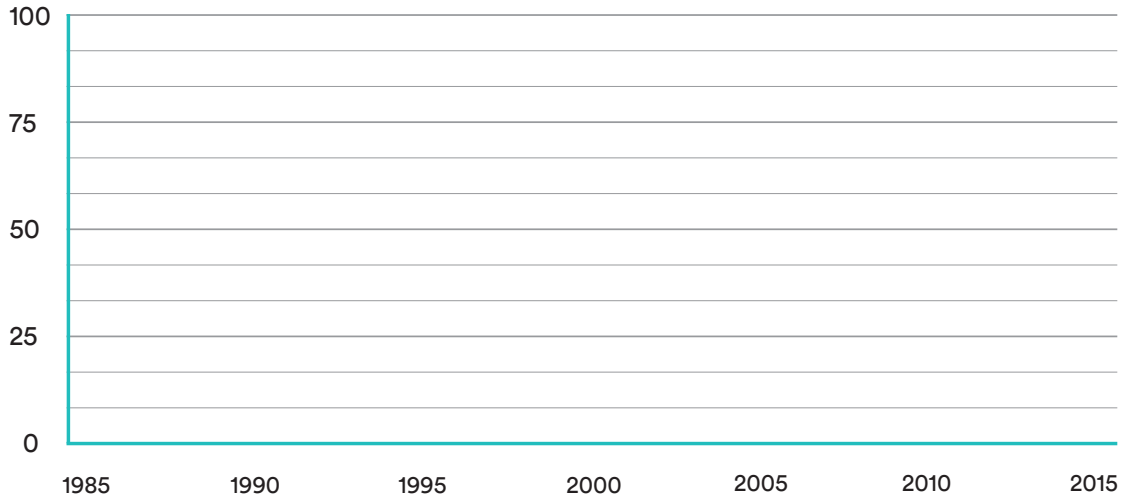
Year	Percentage of people in poverty	Number of people
1985	49	
2000	23	
2006	27	
2009	26	
2015	22	
2018	17	

Image taken from https://borgenproject.org/facts-about-poverty-in-the-philippines/

Source: https://psa.gov.ph/content/poverty-incidence-among-filipinos-registered-216-2015-psa
https://psa.gov.ph/sites/default/files/1997%20Philippine%20Poverty%20Statistics.pdf
https://www.adb.org/countries/philippines/poverty#:~:text=In%20the%20Philippines%2C%2016.6%25%20of,national%20poverty%20line%20in%202018.

2. Complete the trend graph below to show the information in the table.

Poverty incidence (% of population) in Philippines



3. Calculate the amount of people who are living below the poverty line in the Philippines based on the table above and write your answers into the table.

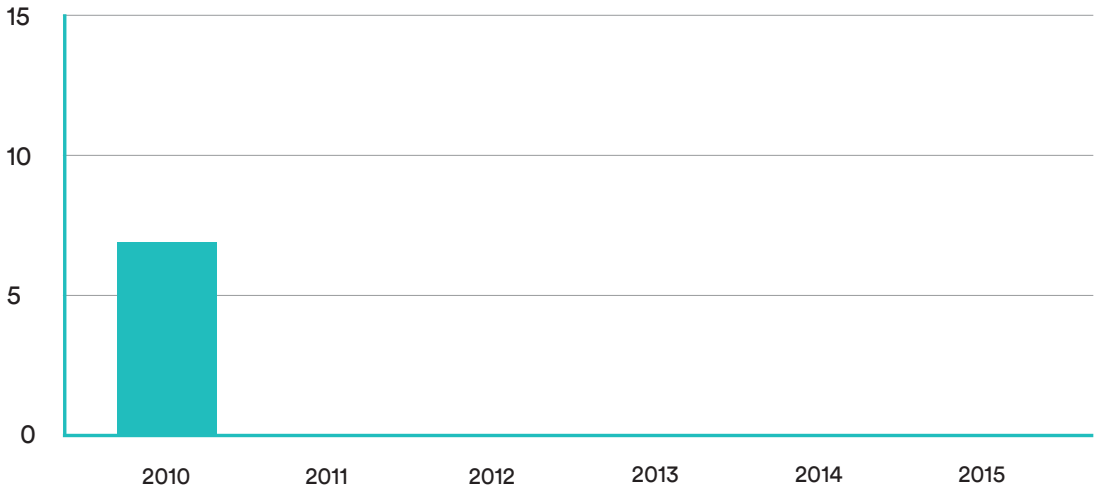
4. The table below shows the poverty incidence in the Republic of Ireland.

Year	Percentage below Poverty Line
2010	6.3
2011	6.9
2012	8.5
2013	9.1
2014	8.8
2015	8.7

https://www.cso.ie/en/aboutus/takingpartinasurvey/surveysofhouseholdsindividuals/surveyonincomelivingconditions/

a. Complete the bar chart below to show the information.

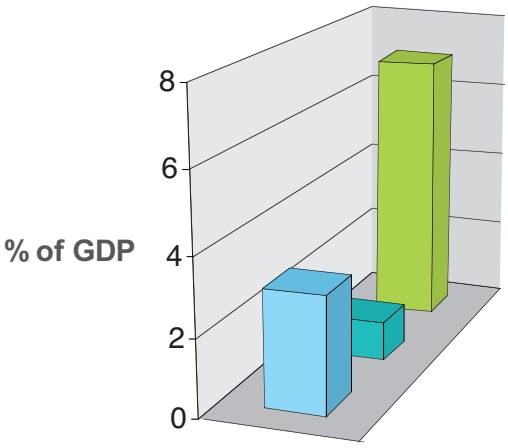
Percentage below poverty line (Ireland)



b. How does the poverty incidence rate compare with the Philippines?

c. In 2015, the population of Ireland was approximately 4.9 million. 5.5% of the population were living below the poverty line that year. How many people was that?

4. When people are living in poverty, they rely on public services and government spending in areas such as education, health and welfare. The graph shows government spending in the Philippines in 2004.



Debt spending compared to education and health in the Philippines in 2004

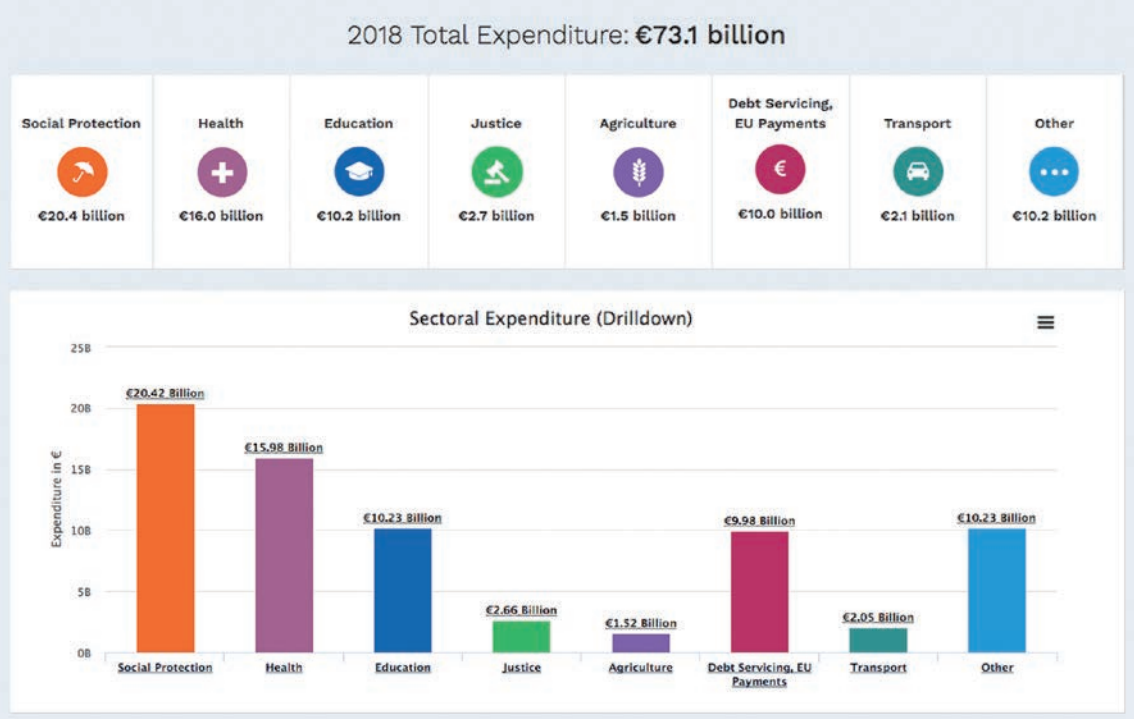
- Education
- Health
- Debt

Debt Villains!
Did you know that in 1986, the President of the Philippines robbed between 5-13 billion dollars that was lent to his country? The people still pay this debt.

Source: http://eurodad.org/uploadedfiles/whats_new/reports/debt%20repudiation%20christian%20aid.pdf

e. What did the government spend most of their money on that year?

f. The bar chart below shows Ireland's Government spending in 2018.



Source: https://whereyourmoneygoes.gov.ie/en/2018/

g. Calculate the percentage expenditure in the following areas in Ireland as a portion of €73.1 billion.

Sector	Amount spent	Percentage of Budget
Health	€	
Education	€	
Debt Servicing, EU Payments	€	

h. Compare the percentage of government expenditure of Ireland and The Philippines.

Sector	Percentage of Budget (Ireland)	Percentage of Budget (Philippines)
Health		
Education		
Debt		

Interpreting Results

1. What do you notice about the trends for the Philippines and Ireland in the graphs you have drawn?

2. How does the spending in the Philippines on Education compare with the spending on Debt?

3. How does the spending in Ireland in 2018 on Education compare with the spending on Debt?

Making Judgements

1. Do you think any element of this situation is unfair? Explain your reasoning?

Communicating my Ideas and Results

Tell your class in a few sentences what you have learnt from carrying out this assignment.

OR

Design a 'Twitter thread' communicating the key ideas from this activity.

Other examples of learning from my portfolio related to this Key Assignment are:

- [ ] I have carried out a case study into a relevant area of mathematics and work.

Key Assignment 7

Ranking countries by different metrics

Finding Out

1. Find the conversion rate for dollars to euro

$ 1 USD = € _____

2. Find out the definition of life expectancy and write it in the box below.

3. Find out the what GDP stands for, and write what it means in the box below.

G_____ D_____ P_____

Collecting/Comparing/Calculating

Below are two tables. One represents the top twelve counties in terms of GDP and the other the bottom ten countries in terms of GDP. The countries in the top ten can be thought of as the wealthiest countries and the countries in the bottom ten can be thought of as the poorest countries in terms of wealth.

1. Convert the GDP *per country* to euros and complete the table.

COUNTRY	GDP in millions USD $	GDP in Euros
Italy	1,934,798	
China	12,237,700	
United States	19,390,604	
Brazil	2,055,506	
European Union	17,277,698	
United Kingdom	2,622,434	
France	2,582,501	
India	2,597,491	
Germany	3,677,439	
Japan	4,872,137	

Workings:

2. Using a pencil, match the country below to their position in terms of highest to lowest GDP.

COUNTRY	Highest GDP in order
Italy	1.
China	2.
United States	3.
Brazil	4.
European Union	5.
United Kingdom	6.
France	7.
India	8.
Germany	9.
Japan	10.

3. For the table below, Convert the GDP per country to euros and complete the table.

COUNTRY	GDP in millions USD $	GDP in euros
Marshall Islands	199	
Tonga	426	
Sao Tome and Principe	391	
Nauru	114	
Palau	292	
Kiribati	196	
Tuvalu	40	
Comoros	649	
Federated States of Micronesia	336	
Dominica	563	

Workings:

4. In pairs, list the countries below in order from highest GDP to lowest.

COUNTRY	Highest GDP in order
Marshall Islands	1.
Tonga	2.
Sao Tome and Principe	3.
Nauru	4.
Palau	5.
Kiribati	6.
Tuvalu	7.
Comoros	8.
Federated States of Micronesia	9.
Dominica	10.

Interpreting Results

1. One of the happiness indicators in the global Happiness survey is Healthy Life Expectancy. The following are the average (mean) life expectancies in the top eight and bottom eight countries in the survey. Complete the table.

Country	Average Life Expectancy in Years 2017 - 2019	Round to 2 decimal points
Italy	73.602	
South Korea	73.603	
Switzerland	74.102	
Iceland	73.000	
Spain	74.403	
Singapore	76.805	
Japan	75.001	
Sweden	72.601	

Country	Average Life Expectancy in Years 2017 - 2019	Round to 2 decimal points
Chad	48.221	
Ivory Coast	49.504	
Central African Republic	45.200	
Burundi	51.188	
Lesotho	48.004	
Nigeria	49.862	
Somalia	51.000	
Sierra Leone	50.865	

Source: World Happiness Report 2020
https://happiness-report.s3.amazonaws.com/2020/WHR20_Ch2_Statistical_Appendix.pdf p.45

2. On the blank map below, mark the top 12 countries and the bottom 10 according to GDP.

3. What do you notice about these countries?

4. On the map below mark the top 12 countries and the bottom 10 according to life expectancy. What do you notice about these countries?

5. Do you notice any patterns in the data you have organized? Discuss with your partner.

Making Judgements

1. In your opinion, is GDP or life expectancy a better measure for evaluating how well a country is doing? Which is more important for governments to take into account when making new policies for the state? Explain your answer.

2. Discuss with your partner and report back to the class.

Communicating my Ideas and Results

In pairs, create a short report for your class using Google Docs . Aim for 8-10 bullet points.

Other examples of learning from my portfolio related to this Key Assignment are:

- [ ] I have carried out a case study into a relevant area of mathematics and planning.

Key assignment 8

National debt

Finding Out

1. Have you ever been in debt? What do you think debt is? Write your definition, and then find a definition on the internet. Compare the two and see what you learn.

My definition of debt	Definition I found

What I learnt:

2. Find out what Ireland's national debt is via https://worlddebtclocks.com/ireland and write it below in figures and words.

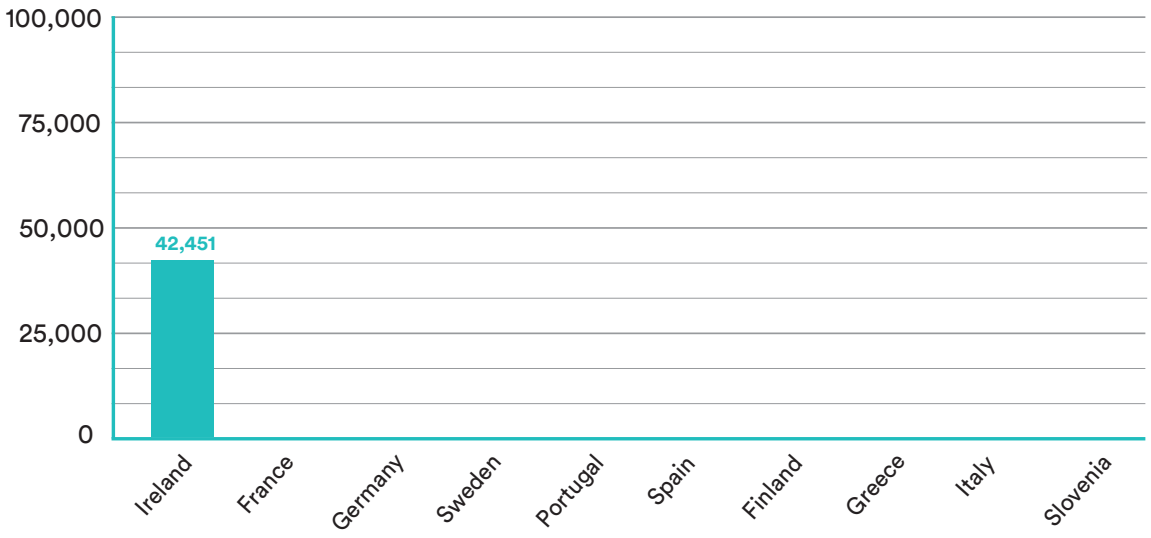
In figures	In words

3. Go to the Debt Clock for countries in the EU and find how much these countries in Europe owed in 2016 as a country and per citizen.
https://www.debtclocks.eu/eu-ranking-public-debt-per-citizen.html

Country	Debt per Citizen
Ireland	42,451.00
France	
Germany	
Sweden	
Portugal	
Romania	
Spain	
Finland	
Greece	
Italy	
Slovenia	

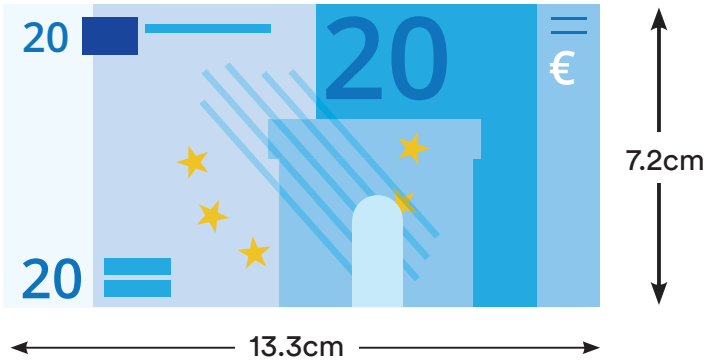
4. Complete the graph to represent debt per citizen to the nearest thousand in 2016 the above European countries.

Debt per citzen (2016)



Collecting/Comparing/Calculating

1. The picture below shows a €20 note, using the measurements given, calculate the area of a twenty euro note.



2. Measure the length and width of your classroom.

a. Length: _____

b. Width: _____

c. Length x width:

3. Based on the area of your classroom, the debt In Ireland and the area of a €20 note, calculate how many times the area of your classroom would need to be covered in €20 notes in order to represent the debt per citizen in Ireland.

a. Ireland's Debt per citizen (2016 figure): _____

b. Calculate many €20 notes would be needed

c. With the help of your teacher change the area of the note to metres squared: _____

d. Area of classroom: _____ m^2

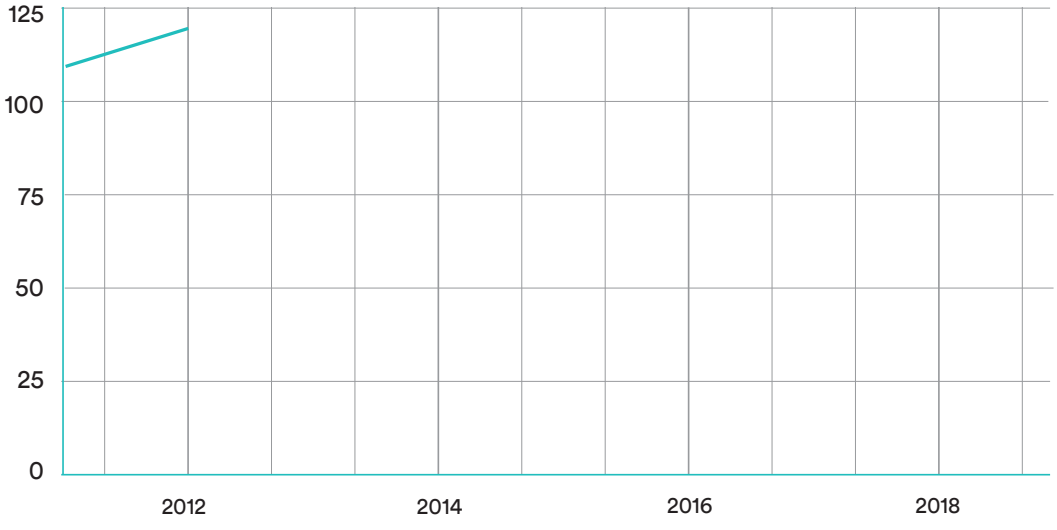
e. Area of classroom that would need to be covered in €20 notes:

4. The table below shows Irish Sovereign (National Debt) as a percentage of GDP from 2012 to 2019. Complete the line graph to illustrate the trend.

Year	Government Debt as a percentage of GDP (rounded)
2011	111
2012	120
2013	120
2014	104
2015	77
2016	74
2017	68
2018	64
2019	59

Source: https://tradingeconomics.com/ireland/government-debt-to-gdp

Ireland's Government debt as a % of GDP



Making Judgements

1. List some examples of things you could buy or do with the debt per Irish citizen.

2. List 3 things that surprised you while carrying out this research:

1. _____

2. _____

3. _____

3. Give 3 examples of reasons why countries borrow money:

1. _____

2. _____

3. _____

Communicating my Ideas and Results

Write a short 'letter to the editor' of a newspaper of your choice about what you have discovered about Irish Debt. This should only be one to two paragraphs long.

OR

Write a headline to describe your findings in relation to covering your classroom with the debt per citizen.

Other examples of learning from my portfolio related to this Key Assignment are:

- [ ] I have carried out a case study into a relevant area of mathematics and the world around me.

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