

Lesson Details	Lesson Study Group
Name of lesson: What's The Point? Topic: Graphing Year group: 1st Year Level: Common	School Name & address: Coláiste Phobail, Roscrea, Co. Tipperary Advisor: Enda Donnelly Teachers: Karen O'Reilly, Orlagh Moloney, Sarah Kirwan

Research Theme
Building on our school's SSE topic, we want to develop formative assessment in maths class. Coláiste Phobail has been given DEIS status for 2022/2023 and we will monitor the progress of the DEIS plan. Graphing is the maths topic we have chosen.

Background & Rationale
We see that our students can have recurring problems drawing and interpreting graphs. These issues can be a barrier to future learning in maths and other subjects.

Relationship of the Unit to the Syllabus		
Prior Learning	Current Learning	Future Learning
Integers, the no. line Geography look at grid references	Graphing in coordinate geometry (linear functions only)	Graphing algebraic functions in maths. Simultaneous equations. Graphs in other subjects.

Goals of the Unit

Students will understand the coordinate plane (plotting points, not mixing up x and y) and be able to correctly draw scaled x and y axis

Students will recognise linear patterns and be able to work with tables and graphs to represent these patterns.

Unit Plan

Lesson	Brief overview of lessons in the unit
1	Introducing cartesian plane (Descartes story, project maths resource), plotting points - possibly with Geogebra Identify and label points shown on a plane: https://www.geogebra.org/m/nXf973Mx plot points (maybe just in the first quadrant) to form e.g. a cartoon character - finish for homework Maybe 10ticks resources https://www.mathsisfun.com/data/click-coordinate.html
2	Plotting points in all 4 quadrants and on the axis. https://www.mathsisfun.com/data/click-coordinate.html select "all 4 quadrants" Identify and label points shown on a plane in all 4 quadrants and on the axis Given a list of points → draw an appropriate pair of axis Labelling axis themselves
3 Research Lesson	Plotting points on a line * link to patterns e.g. sunflower growth, money box or barbie bungee * number patterns e.g. (1,2), (2,5), (3,8), (4,?)....(10,?)

Goals of the Lesson

Students can plot a line when given a group of coordinates

Students can recognise a simple linear pattern from a group of points and use tables and graphs to represent and analyse a pattern.

Flow of the Lesson

Timing, activities, steps, resources, problems	Teacher support, activity	Assessment, questions, comments, strategies
1. “Look for a pattern....” $(1, -1)$, $(4, 2)$, $(-2, -4)$, $(0, -2)$, $(-1, -3)$ and $(5, 3)$? Teacher led example. Individual, then pair work Students are asked to plot line and describe it and list three more points on the line.	5 mins intro 2 mins individual student work, then 6-8 mins discussion and pair work (Label axis and plot points) 10 mins board work/assessment	(Laminated) whiteboards with axis prepared Can you list 3 more points on the line? Can you list 3 more points NOT on the line? Peer assessment
2. Money box Give students the beginnings of a table. Ask them to: Draw and label axes Plot points	20-25 minutes total Teacher introduces and explains the start of the table and which variable goes on which axis(3 mins) €3 at start, add €2 per day Individual work	Teacher led board work and discussion

Use the graph to answer Qs If time allows look at taxi question Homework: Word search (literacy).	Table, plotting/graphing 5 mins Peer assessment of table and graph, then correct table and graph displayed on board. 3 mins Individual work on Q1 (How much money on day 4?) ~ 5 mins (differentiated Qs) Methods: Just keep adding Use table Use (extended) graph Q2 How much money on day 4? ~ 3 mins Q3 When will they have €13? ~ 5 mins T&L Plan here: https://www.projectmaths.ie/documents/T&L/IntroductionToPatterns.pdf	
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Board Plan

See appendix

Evaluation of Lesson

The students enjoyed using the whiteboards. We had been planning for formative assessment and the whiteboards helped students self and peer assess and enabled them to communicate their thinking. A number of students were observed self correcting their work having looked at their peers.

The lesson showed students the importance of setting up the axes correctly. Some students who normally have SNA support in maths class struggled a little during the lesson and will need more support with this material, while faster moving students need to be kept challenged.

The lesson reinforced the earlier material in this unit e.g. the characteristics of points in each of the 4 quadrants and was effective in making links to linear patterns.

Summary of Key Learning

Meeting 1	We need to help our students make links between graphs and their contexts - this could be done when working on patterns and coordinate geometry and stats in maths as well as in science, geography and other subjects. Order of teaching related topics in both science and maths should be examined. We propose working on a unit for first years to tie in with (coordinate) geometry - possibly building on patterns work done earlier in first year.
Meeting 2	Agreed on the maths content for a first year group and worked on a 3-lesson unit plan. Discussed options for the contexts, pedagogies and opportunities to use IT (GeoGebra?)

Meeting 3	Karen shared “Maths in Action” material. The group would like to tie in with DEIS numeracy and literacy pillars. Went into detail on lesson activities and timings provisional research lesson date: Fri 24th of March
Meeting 4	Ran through research lesson flow including timing and checked resources. Developed an observation plan
Meeting 5	Research lesson and post lesson reflection

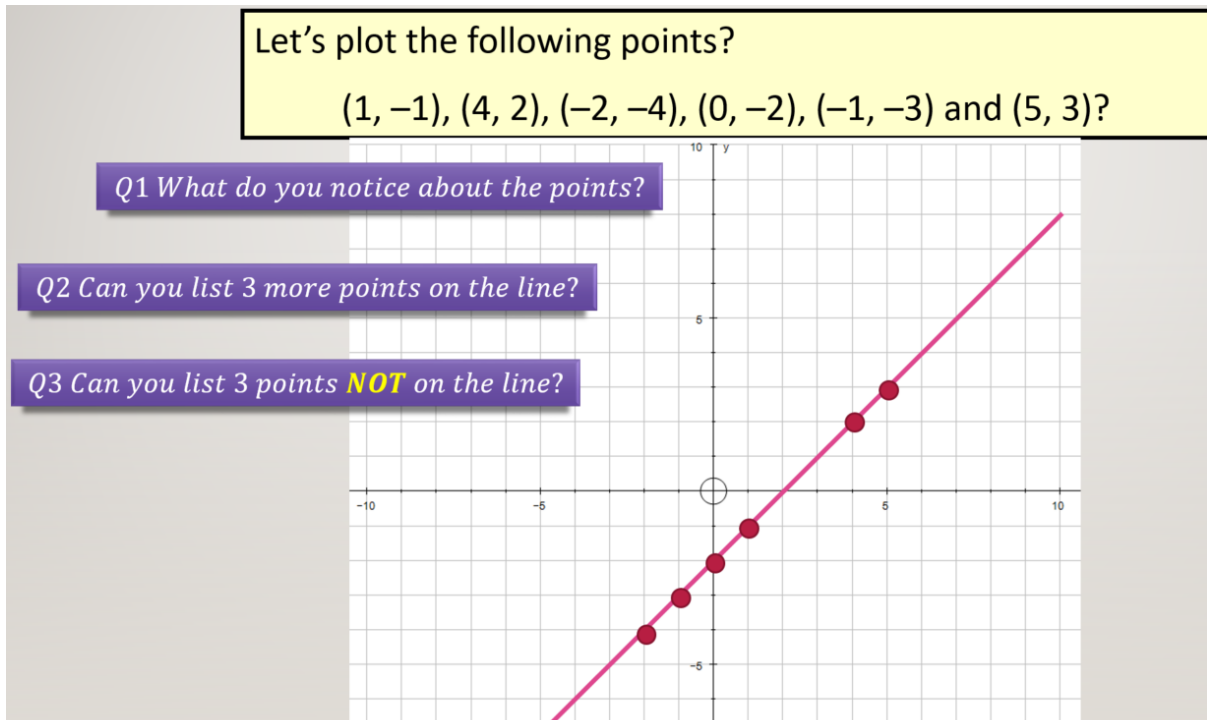
Final Reflection

We feel lesson study was a great way for the three of us to collaborate and plan to teach Maths. We got to share ideas and resources and the lesson study cycle strengthened the relationships in our group so we talk more regularly now about teaching.

We thought about how we teach graphs in maths class and this lead us to change the sequence of some related topics to help students make connections better.

We plan to present our lesson study group’s work at a whole school staff meeting before Summer break.

Appendix - Some of the Student Activities



QUESTIONS

- 1) WHAT DO YOU NOTICE ABOUT THE POINT?
- 2) CAN YOU LIST THREE MORE POINTS ON THE LINE?
- 3) CAN YOU LIST THREE MORE POINTS **NOT** ON THE LINE?
- 4) WHERE DOES THE LINE CUT THE X-AXIS & Y-AXIS?

The Money Box Activity

Problem

John receives a gift of a money box containing €3 for his birthday.

John decides he will save €2 every day, beginning the day immediately following his birthday.

Represent this by drawing a table and a line



Graphing Activity

John receives a gift of a money box containing €3 for his birthday.
John decides he will save €2 every day, beginning the day immediately following his birthday.
Represent this by drawing a table and a line

Day	Money

What goes on this axis?

What goes on this axis?

The Money Box Activity

Question 1

How much money does John have in his money box 4 days after he got the box?

How did you find the answer?

Is there any other way to find out the answer?

Question 2

John wants to buy a new book. The book costs €13. What is the minimum number of days John will have to save so that he has enough money to buy the book?

How did you find the answer?

Is there any other way to find out the answer?

Question 3

John wants to buy a new t-shirt. This costs €25. What is the minimum number of days John will have to save so that he has enough money to buy the t-shirt?

How did you find the answer?

Is there any other way to find out the answer?