Lesson Research Proposal for 2nd years Income Tax

For the lesson on 25/01/18
At Gorey CS, Kate Moran class 2nd Years
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Lesson plan developed by: Kate Moran, John Whooley, Kathleen Broggy and Ann Birchall

1. Title of the Lesson: The "Flow of Money" - Income Tax

2. Brief description of the lesson

In this lesson students will try to solve a tax problem with higher and standard rate of tax, to enhance their understanding of how tax works.

3. Research Theme

At Gorey CS, we want students who:

1) Are motivated through positive learning experiences, that arise from attainable and challenging learning outcomes
2) Have a sense of ownership of their work, take pride in it, and take responsibility for improving it.

As maths teachers, we will actively support the achievement of these goals by:

1) Providing a positive learning environment that allows for collaborative learning and values all ability levels
2) Structuring our lesson to include positive feedback and promote personal reflections.

4. Background & Rationale

a)Why we chose this topic

This problem is aimed at second year students. We have chosen this topic as from our experience; we have noticed recurring problems with regard to income tax. Students find problems involving both higher and standard rate of tax difficult and don't fully understand terms like Tax Credits, Net Income etc.

Teachers might teach this in a procedural way. We feel students do not understand and/or retain the concept of Tax. In particular, students need to understand what they are being taxed as this will be used in later years of second level and of course further on in their lives.

b) Research findings

Through discussions of member of the maths department and reflecting upon our own discussions we feel students just follow the procedure and don't understand what exactly they are solving. We feel this may be a problem when the question is worded a different way or students are asked to work backwards ie. Given the tax payable and asked to find the persons gross salary.

5. Relationship of the Unit to the Syllabus

Related prior learning Outcomes	Learning outcomes for this unit	Related later learning outcomes
1st/2nd class: Introduction to the Euro. Child should be able to: • Calculate how many items may be bought with a given sum. 3rd/4th Class: Child should be able to: • Rename amounts of Euro/Cents using symbol and decimal points. • Solve and complete one-step problems and tasks involving addition and subtraction of money. 5th/6th Class Child should be able to: • Compare "value of money" • Calculate pay, based on hourly or daily rates • Explore value of money – calculate sale prices e.g. 10% discount, 20% VAT added.	• In this unit, students will solve problems that will involve standard and higher rate of tax. • Calculate the percentage of various sums of money. • Understand key words such as Tax Credits, Standard Rate, Higher Rate etc • Calculate gross tax, tax payable, net pay • Identify sums of money to be taxed at standard and higher rates.	• Use other real-life examples to solve similar problems • Calculate problems in forward/reverse order i.e. finding gross tax when given net pay, finding % rate when given gross tax. • Students can calculate their own tax once in employment.

6. Goals of the Unit

(a) Students will understand the "real life" relevance of how income tax is calculated.
(b) Students will understand how to calculate a percentage/decimal of a sum of money.
(c) Students will understand that workers pay income tax on two levels, dependent on how much they earn.
(d) Students will understand what tax credits are.
(e) Students will understand what a "standard rate cut off point" is.
(f) Students will understand all key words associated with calculating Net Pay.
(g) Students will apply their knowledge to calculate take home pay.

7. Unit Plan

Lesson	Learning goal(s) and tasks
1	Introduce the topic of taxing income, and explain key words by giving relevant examples.
2	Use the topic of PRSI to reinforce basic percentage calculations
3	Introduce the standard rate of tax and tax credits
4 The Research Lesson	Introduce The Higher Rate of Tax Use a suitable problem to: • Understand standard and higher rates of tax • Understand how to calculate gross tax • Understand how to calculate tax payable
5	Practice calculating similar problems in forward and reverse order
6 7. .	USC Put it all together

8. Goals of the Research Lesson:

a) Mathematical Goals

Students will:

- Understand that all employment is subject to income tax
- Understand that there are two rates of income tax and that they are based on the level of income received
- Undertand how to calculate a percentage/fraction/decimal of a sum of money
- Understand that tax credits are deducted from gross income tax prior to calculating net pay
- Understand how to work out their own net tax and net income when in employment

b) Key Skills and Statements of Learning

This lesson will address the following key skills:

1. Being Literate: Students will have the opportunity to express their ideas clearly and accurately.
2. Being Numerate: By engaging in suitable tasks, students will gather, interpret and represent data.
3. Managing Myself: By asking students to write a brief reflection at the end of the lesson, they will have the opportunity to reflect on their own learning.
4. Staying Well: By working in groups, students will gain confidence and become more positive about their learning.
5. Communicating: During Ceardaíocht, students will present and discuss their mathematical thinking.
6. Being Creative: Students will explore options and alternatives as they actively participate in the construction of knowledge
7. Working with others: Students will learn with and from each other by discussing different approaches to solving the problem.
8. Managing information and thinking: Students will be encouraged to think creatively and critically.

This lesson also meets the following JC Statements of Learning:

1. The student communicates effectively using a variety of means in a range of contexts.

15. The student recognizes the potential uses of mathematical knowledge, skills and understanding in all areas of learning.

16. The student describes, illustrates, interprets, predicts and explains patterns and relationships.
17. The student devises and evaluates strategies for investigating and solving problems using mathematical knowledge reasoning and skills.

9. Flow of the Research Lesson:

Steps, Learning Activities Teacher's Questions and Expected Student Reactions	Teacher Support	Assessment
Introduction Today we are going to use our mathematical knowledge to solve a problem. We are going to try to solve the problem by ourselves and then we're going to come together as a class and use all your knowledge to learn something new…	Mention classwork from previous classes – calculating percentages.	Are the students motivated?
Emma has a gross income of €38500 for the year. She has an annual tax credit of €3300. The standard rate cut-off point is €33800. The standard rate of income tax is 20% and the higher rate 40%. (a) Find Emma's net income for the year.	Display the question on the board and allow 5 mins for completion. Distribute the work sheet and allow a further 7 mins for completion.	Do students understand the task? (If they don't, it's probably not a good idea to move on) Are students eager to solve the problem?
Student Individual Work Students will display their work and discuss their findings, defending how they came to their conclusions.	Teacher will support the students' during their presentations, using higher order questioning to stimulate further discussing and debate. Teacher will use correct and incorrect answers to highlight common mistakes and future pitfalls.	
Ceardaíocht /Comparing and Discussing Students will compare their initial thoughts with any change of views they had, once the worksheet was handed out. Any common misconceptions or errors will be highlighted	Does the method that they used to eventually solved the question differ to how they approached it initially? Do they understand the concept	Are students defending their ideas? Are they responding to each other's ideas? What seems to be the

by the remaining students. If they are unable to do this, the teacher will pose leading questions. This will be a whole class discussion, with each student being given the opportunity to vocalise their thoughts.	of the standard and higher rates? Why are some employees taxed at a higher rate?	common mistake? Do students understand why it is incorrect to tax the same amount twice?
Summing up & Reflection Using an interactive animation, the teacher will reinforce the concept that the tax paid on the SRCOP remains constant despite changing salary. Ask students to write 3 points for homework beginning with: Today I learned/understood……		

Worksheet.

Problem:

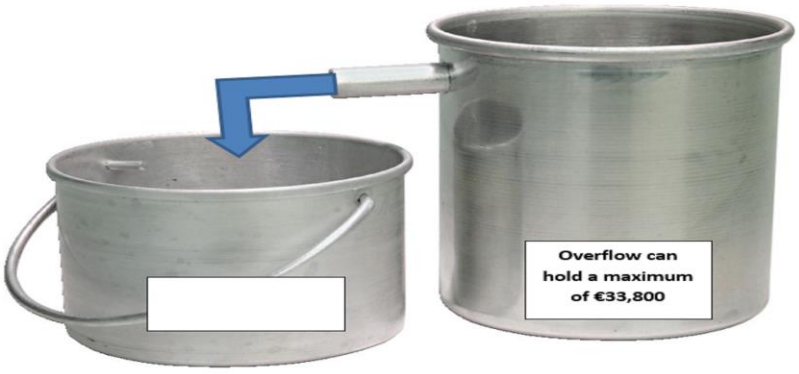
Emma has a gross income of £38 500 for the year.

She has an annual tax credit of £3300.

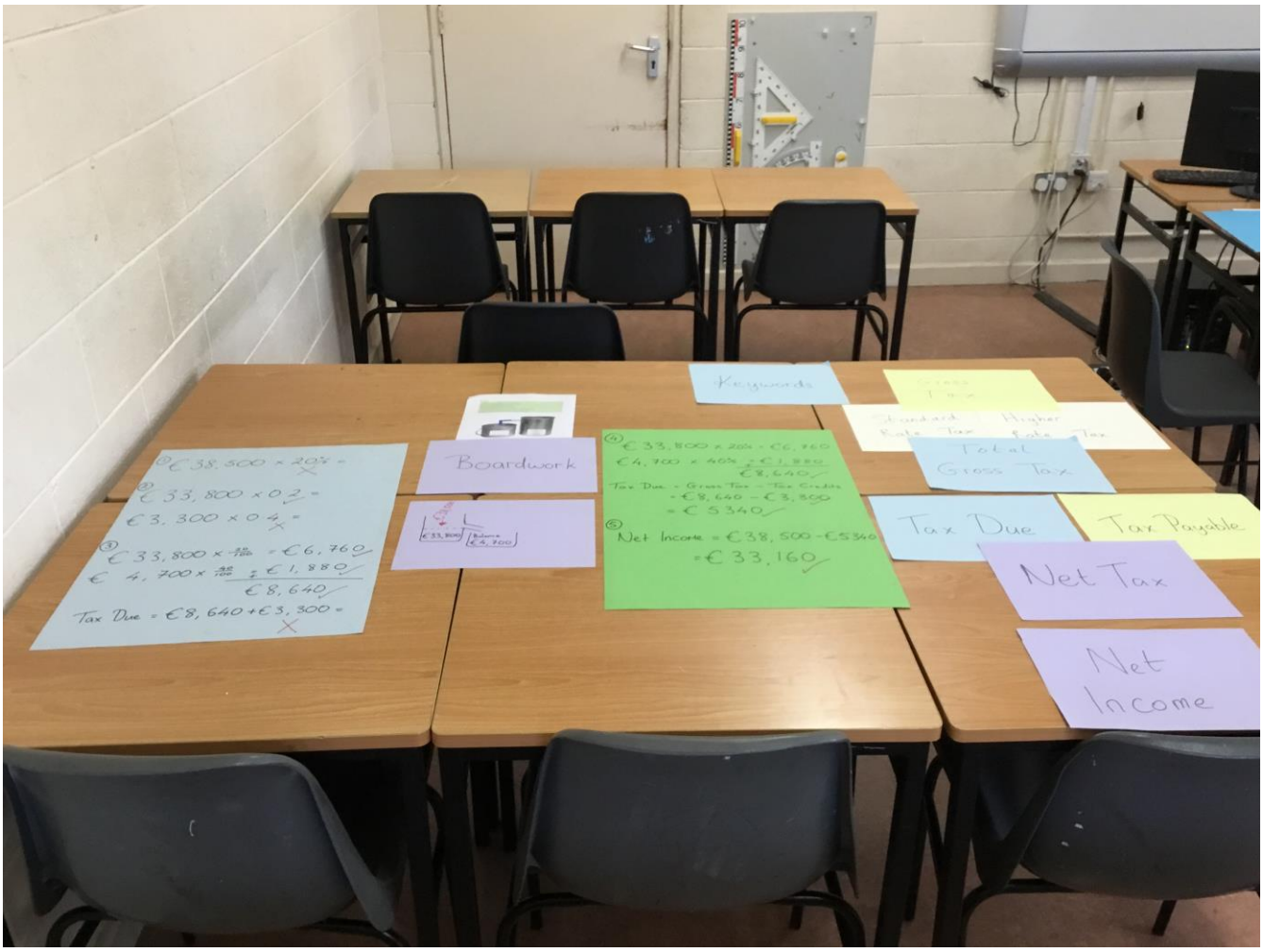
The standard rate cut-off point is £33 800.

The standard rate of income tax is 20% and the higher rate is 40%

Find Emma's Net income for the year (i.e. after tax is paid)?



10. Board Plan



11. Evaluation

- What is our plan for observing how students deal/attempt to solve the problem?
  Walk around and observe students work. Taking notes and pictures of how the students solved the problem.

- What other roles/responsibilities have the observers during the research lesson?
  A seating plan will be laid out so that each of the three observers had a group of students to focus on. While students are working on the task, we as the observers will note methods/approaches used by the students so we can decide on what students to ask to the board and in what order.

- As observers, what are we looking for from the students?
  We are observing to see can all/some students calculate a percentage of a sum of money and what method they use for solving this.
  Do students understand the "standard rate cut-off point" and does the overflow can diagram help student to solve the two different rates of tax.
  Are students correctly calculating the net tax and understanding key words such as "tax credits"

- During the Boardwork/Ceardaiocht are students engaged and participating in the discussion?

Encourage students to discuss what they learned from the lesson and areas of the problem, which they found difficult.
Discuss the overflow can diagram getting students who understood the concept to help explain to the rest of the class why this diagram was used and how it may help in solving the problem.

12. Reflection

During this lesson, we hoped that using the overflow can idea, students would understand how to divide the gross income into the two different tax brackets.
We handed out the worksheet and allowed them to continue without any instruction. They unfortunately did not connect the gross pay with the overflow can.
Following feedback from the students, we realise that more instruction was required as to how to use the overflow can. During the Ceardaiocht when we discussed the overflow can all students found this as a helpful tool to solve the problem, "the diagram in the second one helped me understand it better." Many mentioned in the reflection sheet that they realized through the boardwork where they had gone wrong when they had been working on the problem. The majority of students commented during discussion/reflection sheet that there was more than one way to solve the problem. "I learned that there is different ways to calculate net income"

The students came up with ways that we had not anticipated, of finding the net income. They were quite adept at explaining their methods. One student suggested that tax credits were like a "voucher". This was beneficial in explaining the purpose of tax credits.
From the reflection sheet, which they filled out at the end of the lesson, it was clear that all students enjoyed this form of math lesson. They majority wrote that they thoroughly benefitted from seeing the other students' work on the board and how their train of thought differed from their own.
We think that the overflow can idea could be useful when teaching about the Universal Social Charge – a concept which most students find confusing.

Appendix 1

Quality Framework for Post-Primary Schools – Teaching & Learning

Learner outcomes	Students enjoy their learning, are motivated to learn, and expect to achieve as learners	☐
	Students have the necessary knowledge and skills to understand themselves and their relationships	☐
	Students demonstrate the knowledge, skills and understanding required by the post-primary curriculum	☐
	Students attain the stated learning outcome for each subject, course and programme	☐
Learner experiences	Students engage purposefully in meaningful learning activities	☐
	Students grow as learners through respectful interactions and experiences that are challenging and supportive	☐
	Students reflect on their progress as learners and develop a sense of ownership of and responsibility for their learning	☐
	Students experience opportunities to develop the skills and attitudes necessary for lifelong learning	☐
Teachers' individual practice	The teacher has the requisite subject knowledge, pedagogical knowledge and classroom management skills	☐
	The teacher selects and uses planning, preparation and assessment practices that progress students' learning	☐
	The teacher selects and uses teaching approaches appropriate to the learning intention and the students' learning needs	☐
	The teacher responds to individual learning needs and differentiates teaching and learning activities as necessary	☐
Teachers' collective / collaborative practice	Teachers value and engage in professional development and professional collaboration	☐
	Teachers work together to devise learning opportunities for students across and beyond the curriculum	☐
	Teachers collectively develop and implement consistent and dependable formative and summative assessment practices	☐
	Teachers contribute to building whole-staff capacity by sharing their expertise	☐

Junior Cycle Key Skills and Statements of Learning

Key Skills

KS1	Managing myself
KS2	Staying well
KS3	Monitoring information & thinking
KS4	Being numerate
KS5	Being creative
KS6	Working with others
KS7	Communicating
KS8	Being literate

Statements of Learning

	The student
SL1	communicates effectively using a variety of means in a range of contexts in L1*
SL2	listens, speaks, reads and writes in L2* and one other language at a level of proficiency that is appropriate to her or his ability
SL3	creates, appreciates and critically interprets a wide range of texts
SL4	creates and presents artistic works and appreciates the process and skills involved
SL5	has an awareness of personal values and an understanding of the process of moral decision making
SL6	appreciates and respects how diverse values, beliefs and traditions have contributed to the communities and culture in which she/he lives
SL7	values what it means to be an active citizen, with rights and responsibilities in local and wider contexts
SL8	values local, national and international heritage, understands the importance of the relationship between past and current events and the forces that drive change
SL9	understands the origins and impacts of social, economic, and environmental aspects of the world around her/him
SL10	has the awareness, knowledge, skills, values and motivation to live sustainably
SL11	takes action to safeguard and promote her/his wellbeing and that of others
SL12	is a confident and competent participant in physical activity and is motivated to be physically active
SL13	understands the importance of food and diet in making healthy lifestyle choices
SL14	makes informed financial decisions and develops good consumer skills
SL15	recognises the potential uses of mathematical knowledge, skills and understanding in all areas of learning
SL16	describes, illustrates, interprets, predicts and explains patterns and relationships
SL17	devises and evaluates strategies for investigating and solving problems using mathematical knowledge, reasoning and skills
SL18	observes and evaluates empirical events and processes and draws valid deductions and conclusions
SL19	values the role and contribution of science and technology to society, and their personal, social and global importance

SL20	uses appropriate technologies in meeting a design challenge
SL21	applies practical skills as she/he develop models and products using a variety of materials and technologies
SL22	takes initiative, is innovative and develops entrepreneurial skills
SL23	brings an idea from conception to realisation
SL24	uses technology and digital media tools to learn, communicate, work and think collaboratively and creatively in a responsible and ethical manner

L1 is the language medium of the school (Irish in Irish-medium schools). L2 is the second language (English in Irish-medium schools).