

# Equivalent Fractions 2<sup>nd</sup> Year Ordinary Level

For the lesson on Wednesday 25th January 2017 At Ardscoil na Mara, Mr. O' Donohoe's class Teacher: Michael O' Donohoe Lesson plan developed by: Sarah O' Donohoe, Michael O' Donohoe and Jennifer Wall

- 1. Title of the Lesson: Investigating equivalent fractions
- 2. Brief description of the lesson: Students work individually to graphically represent equivalent fractions in as many ways as they can.
- **3.** Aims of the Lesson: At the end of the lesson the students will be able to represent equivalent fractions pictorially and numerically. We would also like to foster our students to become more independent learners, emphasising that a problem involving equivalent fractions can have several equally valid representations and methods of solution.
- 4. Learning Outcomes: As a result of studying this topic students will be able to recognise equivalent fractions and be ready to find the sum or difference of fractions and to correctly simplify algebraic fractions in the future.

#### 5. Background and Rationale

We see the topic of fractions as one that can cause students a lot of difficulty throughout secondary school. We wanted to start at the beginning to improve students' basic understanding of fractions and build from a stronger base.

In the past, some students tend not to be able to recognise equivalent fractions. This leads to issues in junior and senior cycle when dealing with algebraic fractions.

# 6. Research

Chief Examiner's reports for junior and leaving certificate, Junior Cert syllabus, Fraction walls, text and activity books.

"Teaching Fractions According to the Common Core Standards" by H. Wu The American lesson plan:

 $http://www.lessonstudygroup.net/lg/lesson_plan_docs/DeterminingtheRuleforFindingEquivalentFractionsRev1.pdf$ 

#### 7. About the Unit and the Lesson

Page 22 of the junior cert. syllabus says that students should be able to "use the equivalence of fractions to compare proportions."

Our lesson is designed for an ordinary level  $2^{nd}$  year class. Many of these students would have found the pace in a first year mixed ability group to be faster than they were comfortable with.

We would like these students to feel competent in working with numeric fractions before moving onto algebraic fractions.



# 8. Flow of the Unit:

Lesson		# of lesson periods
1	• Research lesson - Investigating equivalent fractions independently using squared paper.	1 x 40 min. (#1 = research lesson)
2	Adding and subtracting fractions.	2 x 40 min.
3	• Adding and subtracting simple algebraic fractions.	2 x 40 min.

#### 9. Flow of the Lesson

Teaching Activity	Points of Consideration
1. Introduction	
3 minutes	
No recap of prior lesson as this has not been	
covered since first year.	
2. Posing the Task	Teacher will explain where the $(8x12)$
2 minutes	rectangles to be shaded are.
Hand out the worksheets (see Appendix A) and	
explain that the students must work individually	
to shade in one quarter of the (8x12) rectangles	
in as many different ways as they can.	
If they have time students have space to draw 2	
of their own shapes and also shade in <sup>1</sup> / <sub>4</sub> of these	
shapes.	
3. Anticipated Student Responses	
10 minutes (activity)	
Students might represent the fraction in the	
same way using 4 different boxes each time.	
Students might get stuck after shading the first	
diagram.	
<b>R1</b> . Three columns shaded out of the twelve (on	
the left)	
<b>R2.</b> I hree columns shaded out of the twelve	
(somewhere else)	
<b>R3.</b> Two rows shaded out of the eight (on the	
top)	



<b>D4</b> Two rows shaded out of the eight			
<b>R4.</b> I wo lows shaded out of the eight			
(somewhere else)			
<b>R5.</b> Half of a half (Cross shape)			
<b>R6.</b> 24 "random" boxes shaded			
<b>R7.</b> 40 out of 160 boxes shaded			
<b>R8.</b> One quarter of any drawn shape			
4 Comparing and Discussing	The teacher will get st	udents to explain their	
20 minutes	reasoning using their c	wn words	
20 minutes	The first student asked	to the board will be	
We will share as many of the responses R1 to	prompted by the teacher to write a numerical		
R as we see on the day by asking students up	ing students up $f_{raction} = g_{rac}^{2/12}$ and honofully the other		
to the beard	students will follow this load		
to the board.	students will follow th	is leau.	
	There will be a table baside the based that is		
	I here will be a table beside the board that is		
	Student	Exaction	
	Student		
		3/12	
		$\frac{2}{8}$	
		<sup>1</sup> / <sub>2</sub> Of a <sup>1</sup> / <sub>2</sub>	
		24/96	
5. Summing up			
5 minutes			
The teacher will summarize the main ideas of			
the lesson; that the fractions we have on the			
board are all equivalent to 1/4. The denominator			
is always 4 times bigger than the numerator.			

**10. Evaluation** There will be 3 observers in the room and they will observe 6 students each. Each observer will use a form to record observations.



Student's work will be collected at the end of the lesson.



# 11. Board Plan





#### **12.** Post-lesson reflection What are the major patterns and tendencies in the evidence? Discuss

Although some students were slower to start, every student in the room was able to correctly shade <sup>1</sup>/<sub>4</sub> of a rectangle in at least one way.

# What does the evidence suggest about student thinking such as their misconceptions, difficulties, confusion, insights, surprising ideas, etc.?

The students were really well behaved and engaged in their work. They enjoyed the task they had to work on.

The class teacher was particularly impressed with the weaker students on the day.

Circles are problematic as it is not so easy for students to accurately shade a fraction of them. This was dealt with nicely on the day by the teacher and reference was made to diameter length etc.

# In what ways did students achieve or not achieve the learning goals?

The explanations given by students who came to the board were very impressive. They verbally explained their reasoning and were fairly easily able to express the fraction in the relevant form (e.g. 2/8, 3/12).

On the day the teacher was anxious to identify students with correct responses from R1 to R7. If he had waited longer then there would have been a greater choice of students and it would have been possible to ask up students who less often get a chance to contribute in class.

# Based on your analysis, how would you change or revise the lesson?

We felt the worksheet was well sized and clear but it might be worth having the task instructions at the top of the sheet i.e. "Shade in one quarter of the rectangle in as many different ways as you can".

We discussed whether we should ask students to write the fraction for each shading they did (e.g.



2/8, 3/12 etc.) but decided against this as we wanted the teacher to draw this from them at the board. Maybe for a different group this would be done differently.

Otherwise we would not change anything as we felt it went very well on the day.

### What are the implications for teaching in your field?

We feel that this lesson was really worth the effort involved in designing it. The class teacher used the same work sheet to teach adding and subtracting fractions in subsequent classes and reports that this followed nicely from the research lesson. We hope that taking the time to revisit this topic that may not have been clear for these students in first year (and primary school) will put these students in a better position for further fraction work.

All three teachers in the group have begun using this problem solving approach and board work in more of their own lessons and see the benefits in teaching and learning that this approach brings.

Appendix A: sheet given to students



