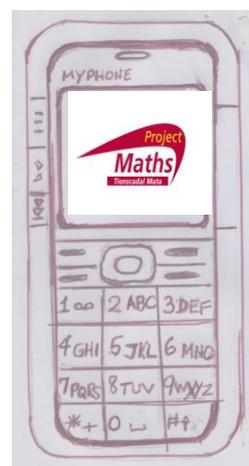


# Teaching and Learning Plan

## Fundamental Principle of Counting



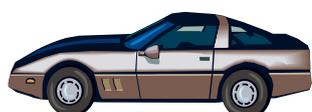
**Target Students:** Junior Certificate Ordinary and Higher

**Prior Knowledge:**

None

**Relationship to Syllabus:**

Fundamental Principle of Counting



**Aims:**

The class will discover for themselves the FPC by examining various examples. The class will then apply this to various options in given situations.

## Learning Outcomes:

At the end of using this methodology pupils will be able to:

- List all possible outcomes from a practical demonstration
- Determine the total number of outcomes in given examples.
- Represent choices using an arrow diagram
- Move from 2 options to 3 options and then more options up to  $3 \times 4 = 12$  options
- Generalise from these examples to deduce the formula for the Fundamental Principle of Counting.
- State the FPC in a formal way
- Apply the FPC to three events. i.e.  $m \times n \times p$
- Apply the FPC to options for texting on a mobile phone (Activity 2)
- Apply the FPC to a general mix of 'in context' questions

**Resources Required:** (The name of any document used is shown inside the brackets)

Powerpoint file ([FPC Introduction](#)), Accompanying Student Activity Sheet (Investigating Choices), Activity 2 ([Mobile phone and FPC](#)), Activity 3 ([Fundamental Principle Act 3](#))

**Lesson Interaction** is set out under four sub-headings:

**i. Student Learning Tasks – Teacher Input:**

This section focuses on teacher input and gives details of the key student tasks and teacher questions which move the lesson forward.

**ii. Student Activities – Possible and Expected Responses:** Gives details of possible student reactions and responses and possible misconceptions students may have.

**iii. Teacher's Support and Actions:** Gives details of teacher actions designed to support and scaffold student learning.

**iv. Checking Understanding:** Suggests questions a teacher might ask to evaluate whether the goals/learning outcomes are being/have been achieved. This evaluation will inform and direct the teaching and learning activities of the next class(es).

Student Learning Tasks: Teacher Input.	Student Activities: Possible and Expected Responses	Teacher's Support and Actions	Checking Understanding
Teacher to show class two groups of items, with 3 items in one group and 2 items in the other. e.g. 2 packets of different flavoured crisps in one group and 3 different coloured lollipops	Students list some of the choices	Teacher to list some of them on the board. Show that order doesn't matter. E.g. green lollipop and bacon crisps is the same as bacon crisps and green lollipop	Student will have a list of some (or all) of the choices.
Teacher to ask "What if the lists were very large?"	Student might attempt to list some of these	Teacher to point out that with large lists it is not possible to list them all and we will investigate another way of working out all the choices.	
Begin the Powerpoint file <a href="#">FPC Introduction</a> presentation and work through the activity Investigating Choices in tandem with the presentation.	Why can't we always list? Answer: the large number of possibilities in some cases make listing not always possible.	Hand out the accompanying worksheet "Investigating Choices". Allow students time to ask questions and discuss their answers as they fill in the worksheet. Arrows a good way to illustrate the choices. On slide 6 get students to predict the total choices for the given examples.	The investigating choices document will be completed by most pupils. The students will be able to deduct and state the fundamental principle of counting.
	There might be a misconception that the FPC only applies to two events	On slide 7 we introduce the idea of the Fundamental Principle of Counting for 3 events. Encourage pupils to solve the problem posed.	Solution $4 \times 5 \times 3 = 60$ This may have to be provided by the teacher

<p>A recap of FPC may be necessary before Activity 2 Ask the class what happens when they use their mobile phone.</p>		<p>Texting on a mobile phone is an example of an application of the FPC in everyday life.</p>	
<p>Hand out the “<a href="#">Mobile phone and FPC</a>” activity sheet.</p>		<p>Get pupils to work in pairs to complete this worksheet at their own pace. Teacher needs to identify students who need support with this activity.</p>	<p>Most students should be able to complete as far as question 5. Problem 6 and 7 are quite challenging and are more suited to the more able student.</p>
<p>Homework/Reinforcement Activity: Distribute the <a href="#">Fundamental Principle Act 3</a> handout</p>		<p>The pupils can work individually on this sheet.</p>	<p>Teachers can choose questions from the sheet to suit the ability level of the class; most able students can complete all questions.</p>

## Activity One – Investigating Choices

Try the questions when your teacher asks you to do so.

**Question 1** Fill in the table

MAIN COURSE	DESSERT
Burger	
Burger	

How many different choices does a customer have if she takes a main course and a dessert? \_\_\_\_\_ choices.

**Question 2** Draw arrows to show all the variations of choosing one main course and one dessert:



MAIN COURSE

DESSERT

--	--

How many different choices does a customer have if she takes a main course and a dessert? \_\_\_\_\_ choices.

**Question 3** Draw arrows to show all the variations of choosing one main course and one dessert:



MAIN COURSE

DESSERT

--	--

How many different choices does a customer have if she takes a main course and a dessert? \_\_\_\_\_ choices.

**Question 4** Draw a diagram, or otherwise, to help you find out how many types of cars are available?

**Question 5** Looking back on your answers, complete the table with the information you have found:

Item 1	Item 2	Choices
1 Main Course	2 Desserts	
2 Main Courses	2 Desserts	
3 Main Courses	2 Desserts	
3 Cars	4 Colours	

Do you notice a pattern here?

You have discovered The Fundamental Principle of Counting!

Now try Activity 2.