

# **A Case Study on the Teaching of Mathematics to the Junior Certificate Schools Programme in One School Setting**

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## **Study Title**

To investigate the possible outcomes of the Junior Certificate Schools Program mathematics education programme in one school setting.

## **Research Proposal**

Over the last decade there have been significant efforts and resources allocated to a number of national numeracy initiatives (Oireachtas Library and Research Report 2009). Many of these initiatives were developed with the needs of the group of schools called DEIS schools (Delivering Equality of Opportunity in Schools) in mind. In particular, these initiatives were developed for the Junior Cert Schools Programmes (JCSP), a program typically offered within DEIS schools. My research looks at maths teaching for a particular cohort of students within a JCSP in a DEIS school and examines how the numeracy initiatives developed for the program may have influenced teaching styles and methodologies and ultimately the Junior Cert Maths results of these students.

The outcome of the implementation of such numeracy initiatives is of interest to the Department of Education and Skills (DES) and the DES has made it clear that schools applying for resources under these schemes must participate in a research dimension. Therefore schools are requested to record testing data using a 'Profile of Mathematical Skills' test, before and after the use of a new resource or the implementation of a new initiative (France). My research proposes to look broadly at the teaching of maths to students in a JCSP in one school setting, taking into account the inclusion or adaptation of available maths resources as proposed by the national maths initiatives. My research then examines the success of this program by analysing three years of Junior Cert Foundation Level Maths results of JCSP students and compares their results to the results of students from the same three years who did not participate in the JCSP programme.

## **Approach**

My research looks at three years intake of JCSP classes (2007, 2008, 2009) in one school setting. I survey key JCSP stakeholders (maths teachers and coordinators) for these classes in an attempt to identify specific teaching methodologies and resources used in the teaching of maths to the JCSP students. I compile the Foundation Level Junior Cert Maths results for all JCSP and non-JCSP students and compare and contrast these results.

## **JCSP Background**

JCSP is a national program sponsored by the DES and the National Council for Curriculum and Assessment (NCCA). This program originated in the early school leavers' programs initiated by the Curriculum Development Unit. Currently the program is operating in over 240 schools throughout the country. JCSP aims to provide a curriculum framework that assists schools and teachers in making the Junior Certificate more accessible to those young people who may leave school without formal qualifications (Second Level Support Service). It attempts to help young people experience success and develop a positive self-image by providing a curriculum and assessment framework suitable to their needs. On completion of the program students receive a profile from the DES which is an official record of their achievements.

## **School Setting**

This research is being conducted in St. Oliver's Community College in Drogheda. The school is under the management of Louth VEC school and has been designated DEIS band 1. This designation recognises that the school is located in and serves an area of high social and economic disadvantage. DEIS schools receive additional funding and may have a lower teacher-student ratio. (Department of Education and Science 2005). The designation also ensures that the most disadvantaged schools benefit from a comprehensive package of supports. The schools strive to maintain a more integrated and joined up response to the issue of educational inclusion.

## **JCSP Numeracy Initiatives**

Within the JCSP, there are a significant number of students who possess incomplete and inadequate numeracy skills and understanding. Consequently, these students experience substantial difficulty with learning across the entire curriculum. This JCSP Numeracy Initiative is part of a DEIS Action Plan to tackle numeracy underachievement and it provides JCSP schools with a 'range of short-term interventions, resources and professional development opportunities to support and promote numeracy development' (JCSP Support Service). Since 1997, the JCSP Support Service has run initiatives where teachers are facilitated in introducing new and creative ways of working with the students. The purpose is to provide opportunities for teachers to develop and explore new strategies, methodologies and interventions to support student learning. The research driving many of these initiatives is that even second level students still benefit from opportunities to work with physical resources and support that enhance their understanding of maths and numeracy (Piaget 1965). Currently there is funding available for schools to source and acquire age-appropriate maths games and/or maths activity packs and to use these resources to support the development of mathematical and numerical understanding among JCSP students.

## **Foundation Level Maths**

The aim of Foundation level maths is to develop students' understanding of mathematical knowledge and techniques required in everyday life and employment with particular emphasis on the meaning of maths in everyday life (curriculumonline.ie). The students' maths skills are maintained and enhanced. Students are encouraged to use calculators accurately and efficiently. Students guided in acquiring maths confidence and knowledge that is applicable and useful.

### **Assumptions**

Some elements of this research are variable, leading to a number of assumptions. The continuity of a teacher cannot be guaranteed across the three years of the JC cycle and an inconsistent number of maths resources may have been used. There may have been movement in and out of the JCSP program. My research assumes that the JCSP maths initiatives and resources have been applied only to the JCSP students. In any given year students in a JCSP program may choose to sit the Junior Cert Ordinary or Higher Level maths paper. For the purposes of this research these results have not been included.

### **The Data**

The JCSP program has been running in St Oliver's for twelve years. First year students are admitted into the program based on the results of their entrance exam, information from their Primary school and profiles compiled by the School Completion officer (School Development Planning Initiative 2011). The class size is typically between fourteen and sixteen. This ratio is further reduced for English and Maths as part of a JCSP literacy and numeracy initiative. The students have six periods of maths per week which are delivered in a 3-way split, where a maths teacher of JCSP would have no more than ten students in the class. Typically, there is a range of students with learning and emotional disabilities in a class of JCSP and it is not uncommon for JCSP students to be assigned one-on-one maths tutoring and/or a Special Needs Assistant.

The JCSP coordinator is notified of upcoming JCSP specific in-service training. Given the commitment of St. Oliver's to JCSP this training, it is often held in the school making it more accessible to the teachers and minimizing loss of teaching hours. A range of resources which are reviewed in this paper have been applied for and received by the school JCSP coordinator or teachers: (JCSP Support Service):

### Science Research Associates (SRA) Maths Laboratory

The Maths Laboratory is a set of standardised, graded, colour-coded and differentiated work-cards (McGraw Hill 2012). The individual needs and existing knowledge and competency levels of the individual student determine and indicate the specific and most appropriate learning route to be taken through the laboratory assignments. Parker (2000) states that the Maths Laboratory provide schools with a 'flexible and systematic programme that can be easily implemented to fit into a variety of school calendars and schedules'.

### Flashmaster Maths (2012)

Teacher and their students who have struggled to master their tables are offered a fresh approach. This initiative offers a piece of Maths equipment that has been used successfully in the USA for a number of years. The Flashmaster is a handheld device that looks rather like a calculator but does much more. It allows students to practice their maths facts-Multiplication Tables, Division Tables Addition Tables and Subtraction tables in an enjoyable way. Students can set goals for speed and accuracy at different levels in any of the 4 table areas. Teachers can monitor and customize the Flashmaster to practice particular skills or revisit special problem areas. The Flashmaster can be set to “remember” the areas that cause difficulty. With a class set, a Tables Challenge or Maths Facts Challenge could be set once students have gained confidence in using the Flashmaster. Pre and post testing is not required with this device as it records the progress and class record sheets will accompany the initiative.

### Maths Games

This initiative provides opportunities for teachers to source and acquire age-appropriate maths games and/or maths activity packs and to use these resources to support the development of mathematical and numerical understanding among JCSP students. Teachers may also opt to plan, construct and develop their own maths games and activity packs.

### Hand Held Gaming Devices

This is a class set of hand held gaming devices which can come with two pieces of software to try out. The software includes activities such as Challenge Me Maths Workout, Personal Trainer Maths, Brain Age Express Maths, Maths Play, Maths Blaster etc. At St. Oliver’s, the JCSP teachers requested previously used devices as a cost-saving measure.

### Number Millionaire

This resource is a series of quiz questions and each has a choice of four answers attached; three of the answers are incorrect. The student tries to identify the correct answer by performing mental computation and / or deduction. Whenever a student is unsure of the correct answer he / she can avail of the support provided by four Lifelines (50:50, Ask A Friend, Use a Friend, Ask the Audience) to arrive at the correct answer. The quiz is usually planned and structured as an individualised activity, involving one contestant at a time, but can also be implemented as a paired or collaborative activity involving two or more students. This resource also comes with teacher manuals and a Number Millionaire Thermometer poster.

### Make Your Own 'Opoly' (2012)

This is a resource base on the 'Monopoly' board game. Teachers can construct and develop their own personalized, contextualized and localized board game to generate interest in Maths and Numeracy among JCSP students and to enhance the students' understanding of maths and Numeracy. St. Oliver's received a starter pack with guidelines and a workbook for the students.

### Cross-aged Paired Maths Initiative

This initiative promotes planning and developing a framework for linking Fifth Year/Transition Year students with JCSP students in order to support the development and enhancement of mathematical and numerical competencies among JCSP students. A set of guidelines are provided to aid the implementation of this.

### Other

The following support materials have also been used: "LUVE 2C You" bookmarks and posters (Appendix D), "Computational Clocks" posters and folder-inserts and maths achievement certificates.

### **Quantitative Discussion**

The quantitative data collected is presented in table form in Appendix A. Three years of Junior Cert results are presented for students who sat the foundation level exam only. The data is grouped by JCSP students and non-JCSP students for each year. Within each year the students are sorted by their grade. The combined results for all students for the three years are also presented in a second table. A value of 5 is assigned to an A, 4 to a B, 3 to a C, 2 to a D and 1 to an E. The numerical value of the results is added and an average is calculated for each group for each year and for each group across the three years. The difference between the two sets of results over the three years was 0.28. A T-test was used to compare the two groups and a P-value of 0.096 was determined to not be statistically significant. A P-value below 0.05 is generally considered statistically significant, while one of 0.05 or greater indicates no difference between the groups. The summary of the quantitative results is as follows:

<b>Year</b>	<b>Results JCSP</b>	<b>Class Size</b>	<b>Results Non-JCSP</b>	<b>Class Size</b>
2010	3.56	25	3.41	34
2011	3.38	13	3.69	46
2012	3.09	24	3.68	26

### JCSP Teacher Survey

Four JCSP teachers of varying backgrounds were surveyed (Appendix B). Two of the teachers had been teaching maths to JCSP students for no more than four years. The other teachers had been involved in the programs for six to ten years. The greatest challenges faced by each of the JCSP teachers are the behaviour and social skills of the students and their low ability in quantitative reasoning. Two of the teachers commented that motivation is poor. In general, the available JCSP resources were viewed as valuable instructional supports for the JCSP maths classroom. One of the senior teachers pointed out that the JCSP resources are ideal for making maths work 'fun'. She commented that the notion of 'I'm not good at maths' is pervasive among these students and said it is vital to move them away from this attitude.

The hand held gaming devices and 'make your own Opolo' resources were said to be particularly engaging but only if there was a lack of behavioural issues in the class. The paired maths initiative was found to be both engaging and productive however the coordination of timetables proved challenging. Booklets of maths games were widely used although one teacher stated that a number of the resources were too advanced for some of his students, however he regularly used them in higher streamed classes. Another teacher found that Maths Lab was a useful resource for differentiation. Students of varying ability can work independently thus allowing more individual instruction.

The overwhelming feedback from all four teachers is that small class sizes allow for effective instruction and varied approaches in the JCSP setting. The students' recall is a problem brought up by all the teachers. The small class size allows for the time to work through and explain concepts but retention is a problem and teachers employ rote learning and repetition to promote retention.

Two of the teachers were aware of the JCSP Maths Statements and Basic Skills Statements (Appendix C) where a student's progress across a comprehensive list of skills is tracked and documented. They felt that they are an excellent set of guidelines but that the maintenance of such volumes of documentation is prohibitive.

Although the JCSP coordinator was well informed about the range of resources and initiatives for JCSP and was aware of at least one teacher applying for such resources, there appeared to be a lack of cohesion among the four teachers surveyed. They did not appear to be a department-wide approach or a sharing of ideas and methodologies.

## **Analysis**

Recommended teaching methodologies employed for the instruction of maths to children with learning disabilities appear to be taken from both constructivist and behavioural theories. At St. Oliver's Community College this is seen in the provision and implementation of an array of JCSP math initiatives and indeed in their administration of the entire JCSP Program. The constructivist theory promotes the relating of lessons to real life situations, activities that promote active learning, and the development of high level skills supported by clear explanations. Instruction based on constructivist theory is currently supported for general education classes by many educational organizations (Brooks & Brooks, 1999). One of the key ideas associated with constructivist theory is that learning should be meaningful and related to real-life situations (Grobeck, 1999). Active learning is an important facet of a constructivist approach to instruction. When students are actively involved in the lesson, they learn and retain the information (Duhaney 2000). Many of the resources developed by the JCSP Support team and routinely used in this school are clearly grounded in 'learning by doing' or an inquiry approach to maths instruction. Inquiry based learning and teaching strategies appear to offer many advantages to students in that it encourages problem solving and risk taking in maths (Perez, 2000).

The more traditional instructional approach or behavioural theory promotes extra practice and review, structure and predictable review and small segment tasks which is all made possible by the teacher-student ratio in JCSP. The application of behaviourist theory to the classroom has generally been referred to as explicit or direct instruction. Although these approaches have been criticized for use in the general education setting, they have shown promising research results, particularly for children with learning problems (Mercer, 1997). Therefore, it is worth considering the positive aspects of the behaviourally oriented approaches so that they can be combined with some of the ideas that are now more popular in the general education setting. The teacher survey revealed that retention and recall of mathematical concepts is key challenge for JCSP students. The behavioural approach of rote learning is used effectively but not exclusively by the teachers.

The quantitative results of this study demonstrate that the JCSP participants at St. Oliver's Community School, from a State exam perspective, are performing at a level equivalent to many of their peers who are not part of the program. JCSP students are a cohort that has been identified as being at risk of dropping out of the educational system prior to the JC. In this school setting, they are performing at the same level as a large group of mainstream students. The JCSP coordinator mentioned that their success with the program would warrant adding a third class of JCSP to each incoming first year. However the lack of funding does not make this a viable option.

From my research, it is clear that there is tremendous value in the existing resources that have been developed for JCSP. In the absence of lower teacher-student ratios for the mainstream classes, it may be of benefit to look at the range of resources available to the JCSP teachers and consider

providing them to mainstream teachers, given the apparent success of JCSP maths education. For some activities, the higher student-teacher ratio of the mainstream class would make this prohibitive. However, my research suggests that many of the games, activity books and the paired maths could be used or adapted to a mainstream class and this appears to be already in place for some of the teachers.

The development of an integrated numeracy strategy requires a 'whole-school commitment to numeracy improvement and development' (McCarthy 2009). The success of this JCSP program is multi-faceted. Research by Rittle-Johnson et al (2001) concluded that both conceptual understanding and procedural proficiency develop best when they are both emphasised in the classroom using a variety of approaches. Teachers are required to use 'conscious manipulation' (Evans 2007) of their professional knowledge and the resources available to enhance the learning outcomes of their students. There was evidence of this type of conscious manipulation among the teachers surveyed. However, the survey of the JCSP stakeholders did not demonstrate a cohesive department-wide strategy, but rather, teachers operating in isolation all the while attaining demonstrable success with their students. The JCSP Literacy and Numeracy Initiative Evaluation report (2007) concludes that the program inherently enables teachers to assist and lead other teachers. This cooperative knowledge sharing between JCSP teachers themselves and between JCSP and the mainstream maths teachers were not observed in my research, pointing to a potential area of relevant educational research for maths instruction.



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## Appendix A

### 2010 Results

JCSF			Non-JCSF		
Student001	A	5	Student026	A	5
Student002	A	5	Student027	A	5
Student003	A	5	Student028	A	5
Student004	A	5	Student029	A	5
Student005	A	5	Student030	B	4
Student006	B	4	Student031	B	4
Student007	B	4	Student032	B	4
Student008	B	4	Student033	B	4
Student009	B	4	Student034	B	4
Student010	B	4	Student035	B	4
Student011	B	4	Student036	B	4
Student012	B	4	Student037	B	4
Student013	C	3	Student038	B	4
Student014	C	3	Student039	B	4
Student015	C	3	Student040	B	4
Student016	C	3	Student041	B	4
Student017	C	3	Student042	B	4
Student018	C	3	Student043	B	4
Student019	C	3	Student044	C	3
Student020	C	3	Student045	C	3
Student021	C	3	Student046	C	3
Student022	C	3	Student047	C	3
Student023	D	2	Student048	C	3
Student024	D	2	Student049	C	3
Student025	D	2	Student050	C	3
			Student051	C	3
			Student052	C	3
			Student053	C	3
			Student054	D	2
			Student055	D	2
			Student056	D	2
			Student057	D	2
			Student058	E	1
			Student059	E	1
<b>Total</b>		<b>89</b>			<b>116</b>
<b>Average</b>		<b>3.56</b>			<b>3.411765</b>

**2011 Results**

<b>JCSP</b>			<b>Non-JCSP</b>		
Student060	A	5	Student073	A	5
Student061	A	5	Student074	A	5
Student062	B	4	Student075	A	5
Student063	B	4	Student076	A	5
Student064	B	4	Student077	A	5
Student065	B	4	Student078	A	5
Student066	B	4	Student079	A	5
Student067	B	4	Student080	A	5
Student068	C	3	Student081	A	5
Student069	C	3	Student082	A	5
Student070	D	2	Student083	B	4
Student071	E	1	Student084	B	4
Student072	E	1	Student085	B	4
			Student086	B	4
			Student087	B	4
			Student088	B	4
			Student089	B	4
			Student090	B	4
			Student091	B	4
			Student092	B	4
			Student093	B	4
			Student094	B	4
			Student095	B	4
			Student096	B	4
			Student097	B	4
			Student098	B	4
			Student099	B	4
			Student100	C	3
			Student101	C	3
			Student102	C	3
			Student103	C	3
			Student104	C	3
			Student105	C	3
			Student106	C	3
			Student107	C	3
			Student108	C	3
			Student109	C	3
			Student110	C	3
			Student111	C	3
			Student112	C	3
			Student113	C	3
			Student114	D	2
			Student115	D	2
			Student116	D	2
			Student117	D	2
			Student118	D	2

**Total  
Average**

44  
3.384615

170  
3.695652

**2012 Results**

<b>JCSP</b>			<b>Non-JCSP</b>		
Student119	A	5	Student143	A	5
Student120	A	5	Student144	A	5
Student121	B	4	Student145	A	5
Student122	B	4	Student146	A	5
Student123	B	4	Student147	A	5
Student124	B	4	Student148	A	5
Student125	B	4	Student149	B	4
Student126	C	3	Student150	B	4
Student127	C	3	Student151	B	4
Student128	C	3	Student152	B	4
Student129	C	3	Student153	B	4
Student130	C	3	Student154	B	4
Student131	C	3	Student155	B	4
Student132	C	3	Student156	C	3
Student133	D	2	Student157	C	3
Student134	D	2	Student158	C	3
Student135	D	2	Student159	C	3
Student136	D	2	Student160	C	3
Student137	D	2	Student161	C	3
Student138	D	2	Student162	C	3
Student139	D	2	Student163	C	3
Student140	D	2	Student164	D	2
Student141	D	2	Student165	D	2
Student142	D	2	Student166	D	2
			Student167	D	2
			Student168	D	2

**Total**  
**Average**

71  
3.086957

92  
3.68

**Cumulative Results (2010-2012)**

<b>JCSP</b>			<b>Non-JCSP</b>		
Student001	A	5	Student026	A	5
Student002	A	5	Student027	A	5
Student003	A	5	Student028	A	5
Student004	A	5	Student029	A	5
Student005	A	5	Student073	A	5
Student060	A	5	Student074	A	5
Student061	A	5	Student075	A	5
Student119	A	5	Student076	A	5
Student120	A	5	Student077	A	5
Student006	B	4	Student078	A	5
Student007	B	4	Student079	A	5
Student008	B	4	Student080	A	5
Student009	B	4	Student081	A	5
Student010	B	4	Student082	A	5
Student011	B	4	Student143	A	5
Student012	B	4	Student144	A	5
Student062	B	4	Student145	A	5
Student063	B	4	Student146	A	5
Student064	B	4	Student147	A	5
Student065	B	4	Student148	A	5
Student066	B	4	Student030	B	4
Student067	B	4	Student031	B	4
Student121	B	4	Student032	B	4
Student122	B	4	Student033	B	4
Student123	B	4	Student034	B	4
Student124	B	4	Student035	B	4
Student125	B	4	Student036	B	4
Student013	C	3	Student037	B	4
Student014	C	3	Student038	B	4
Student015	C	3	Student039	B	4
Student016	C	3	Student040	B	4
Student017	C	3	Student041	B	4
Student018	C	3	Student042	B	4
Student019	C	3	Student043	B	4
Student020	C	3	Student083	B	4
Student021	C	3	Student084	B	4
Student022	C	3	Student085	B	4
Student068	C	3	Student086	B	4
Student069	C	3	Student087	B	4
Student126	C	3	Student088	B	4
Student127	C	3	Student089	B	4
Student128	C	3	Student090	B	4
Student129	C	3	Student091	B	4
Student130	C	3	Student092	B	4
Student131	C	3	Student093	B	4
Student132	C	3	Student094	B	4

**Cumulative Results (2010-2012)**

<b>JCSP</b>			<b>Non-JCSP</b>		
Student023	D	2	Student095	B	4
Student024	D	2	Student096	B	4
Student025	D	2	Student097	B	4
Student070	D	2	Student098	B	4
Student133	D	2	Student099	B	4
Student134	D	2	Student149	B	4
Student135	D	2	Student150	B	4
Student136	D	2	Student151	B	4
Student137	D	2	Student152	B	4
Student138	D	2	Student153	B	4
Student139	D	2	Student154	B	4
Student140	D	2	Student155	B	4
Student141	D	2	Student044	C	3
Student142	D	2	Student045	C	3
Student071	E	1	Student046	C	3
Student072	E	1	Student047	C	3
			Student048	C	3
			Student049	C	3
			Student050	C	3
			Student051	C	3
			Student052	C	3
			Student053	C	3
			Student100	C	3
			Student101	C	3
			Student102	C	3
			Student103	C	3
			Student104	C	3
			Student105	C	3
			Student106	C	3
			Student107	C	3
			Student108	C	3
			Student109	C	3
			Student110	C	3
			Student111	C	3
			Student112	C	3
			Student113	C	3
			Student156	C	3
			Student157	C	3
			Student158	C	3
			Student159	C	3
			Student160	C	3
			Student161	C	3
			Student162	C	3
			Student163	C	3
			Student054	D	2
			Student055	D	2
			Student056	D	2
			Student057	D	2

**Cumulative Results (2010-2012)**

JCSP

<b>Non-JCSP</b>		
Student114	D	2
Student115	D	2
Student116	D	2
Student117	D	2
Student118	D	2
Student164	D	2
Student165	D	2
Student166	D	2
Student167	D	2
Student168	D	2
Student058	E	1
Student059	E	1

**Total**  
**Average**

204  
3.290323

378  
3.566038

## **Appendix B**

### **JCSP Questionnaire – JCSP Co-ordinator (1)**

How long is it running in St Oliver's Community College (SOCC)?

How do student gain entry into JCSP?

How many classes of JCSP are there per year?

What is the stipulated class size for JCSP?

What is the average size of JCSP class for this school?

What is the teacher student ratio?

What type of learning disabilities do student have?

What is the average reading age for the JCSP student?

Are students within a JCSP entitled to additional maths resources?

Typically who would deliver these resources?

Would there be an SNA assigned to any of the JCSP students?

How many maths classes do they have per week?

Do you send maths teachers on in-service specific to JCSP?

Are you aware of other JCSP math initiatives coming up

Which of the following Maths resources/initiatives have been applied for?

Flashmaster Maths

Maths Lab

Maths Games

Fast Fire Maths

Darts for Numeracy

Cross aged paired maths initiative

Number Millionaire

Make your own Opoly



## **Appendix B**

### **JCSP Questionnaire – JCSP Teachers (4)**

How long have you been teaching JCSP Maths?

How many sessions classes per week would a JCSP class have?

Estimate the average size of you JCSP class?

Do the students receive any additional support?

What do you find are the biggest challenges?

Outline specific training or in-service that you have been offered and attended?

Have you applied for and received specific JCSP maths resources?

Have you used them?

Have you found them useful?

Can you identify JCSP specific resources that you use in the classroom?

Can you outline any teaching methods that you have used and find successful?

Which of the following Maths resources/initiatives have been applied for?

Flashmaster Maths

Maths Lab

Maths Games

Fast Fire Maths

Darts for Numeracy

Cross aged paired maths initiative

Number Millionaire

Make your own Opoly

Outline your impression or success with any of the resources used.

## Appendix C

### Maths Statements

## Area of Experience: Mathematical Education

## Maths

At Junior Certificate level the student can:

1 Use of Number Apply the knowledge and skills necessary to perform mathematical calculations	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2 Sets, Relations and Charts Interpret and draw basic statistical charts and sets	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
3 Perimeter, Area and Volume Calculate perimeter, area and volume of given shapes	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
4 Money Apply the knowledge and skills needed to manage money in daily life	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
5 Use of Calculator Apply the knowledge and skills necessary to perform basic operations using a calculator	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
6 Use of Number with Calculator Apply the knowledge and skills necessary to perform mathematical calculations	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
7 Graphs, Constructions and Transformations Apply the knowledge and skills required to sketch graphs and transformations and to perform basic constructions in geometry	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
8 Time, Speed and Scale Demonstrate and apply an understanding of time, speed and scale	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
9 Knowledge and Application of Geometry Apply the knowledge and skills necessary to perform specified geometrical operations	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
10 Knowledge and Application of Algebra Apply the knowledge and skills necessary to perform specified operations in algebra	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
11 Circle, Cylinder and Sphere Calculate the perimeter, area and volume of curved shapes	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
12 Trigonometry Use trigonometry to solve problems	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
13 Sets and Statistics Draw and interpret sets and statistics	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
14 Knowledge and Application of Geometry 2 Perform additional operations in Geometry	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
15 Knowledge and Application of Geometry 3 Perform further operations in Geometry	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

NOTE: Use of a scientific non-programmable calculator is permitted

Work begun   
Work in progress   
Work completed

## RESOURCES

### THEME POSTERS

- The Circle
- Length
- Capacity / Volume
- Displaying Data
- Time
- Weight / Mass



### STRATEGY POSTERS

- "LUVE 2 C U" – Problem Solving Strategy
- "Computational Clocks"
- Keywords

### STUDENT DESIGNED POSTERS

Set of posters, which have been developed from the creative designs and sketches of JCSP students who participated in the JCSP Numeracy Poster Competition

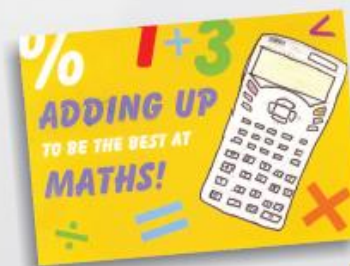


### ACHIEVEMENT CERTIFICATES

Mathematical Achievement Certificate  
Paired Maths Achievement Certificate

### BOOKMARKS

"LUVE 2 C U" bookmark



### POSTCARDS

Student-developed maths / numeracy postcards

## **Ideas Based on Behavioral Theory**

- Break down tasks into small segments
- Model, demonstrate, and explain each step in a procedure or new task
- Include as much extra practice and review as needed for mastery to occur
- Incorporate structure and predictable routine into lessons

Use monitoring and feedback as lesson progresses rather than waiting until conclusion

Tie it into and mixed practice of constructivism and behaviour theory approaches and instruction

## **Summary of Key Ideas for Teaching Students With LD in the General Education Classroom**

- 

References

## **Numeracy Initiatives**

Since 1997 the JCSP Support Service have run initiatives where teachers are facilitated in introducing new and creative ways of working with the students. The purpose is to provide opportunities for teachers to develop and explore new strategies, methodologies and interventions to support student learning. Many of the initiatives are an extension of the sharing of best practice at in-service. Strategies and interventions that have proven to be successful are further developed and explored by teachers involved in the JCSP.

The initiatives provide teachers with a small subvention to facilitate them in investigating and evaluating a specific strategy or intervention. Other initiatives are developments of successful interventions which are supported by the provision of guidelines and materials at in-service. As part of the Student Profile System many statements have been designed that describe the skills and knowledge attained by student involved in specific initiatives.

Numeracy Planning Guidelines

### **SDPI Review Instruments for DEIS Planning**

#### **DEIS: An Action Plan for Educational Inclusion**

Over the years, no less than 8 separate schemes to tackle educational disadvantage have been put in place with some schools benefiting from just one or two of these and others benefiting from more. The DEIS initiative is designed to ensure that the most disadvantaged schools benefit from a comprehensive package of supports, while ensuring that others continue to get support in line with the level of disadvantage among their pupils. While there are benefits in individual interventions and programmes, a more integrated and joined up response to the issue of educational inclusion is required.

### **Maths Laboratory**

The Maths Laboratory contains a suite of standardised, graded, colour-coded and differentiated workcards. The individual needs and existing knowledge and competency levels of the individual student determine and indicate the specific and most appropriate learning route to be taken through the laboratory assignments. Parker (2000) states that the Maths Laboratory provides schools with a 'flexible and systematic programme that can be easily implemented to fit into a variety of school calendars and schedules'.

Then back up the strategy with research papers

Show the JC results , compare and contrast

Interview the teachers for their awareness of national strategies,  
training,  
support,  
application for grants and tools,

their own approaches and methodologies

Mention the small class size which is central to the JCSP program

The Junior Certificate School Programme (JCSP) Support Service is funded by the In-Career Development Unit, DES and the European Social Fund

JCSP Support Service is a national programme sponsored by the DES and NCCA.

JCSP Support Service is managed and coordinated by the CDVEC Curriculum Development Unit under the auspices of the Professional Development Services for Teachers

Publication of various on ongoing workbooks under the JCSP Literacy and Numeracy Strategy

