Mathematics School Plan

Property of St. Joseph's NS, Kilcock

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Ratified by BOM 17th May 2021

Aims:

The aim of our Maths policy is to implement and adopt the aims and objectives of the Curriculum as they are stated and outlined in pages 12-14 of the Curriculum Handbook.

Mission Statement:

Saint Joseph's N.S. will use the Maths Programme as such:

1. To equip the children with mathematical skills and understanding to apply acquired knowledge, to make informed choices and decisions, to predict and hypothesise, and to use deductive reasoning to eliminate or conclude.
2. To develop the children's confidence in Maths and apply this to mathematical tasks in everyday life.
3. To enable every child to use mathematical language and acquire mathematical concepts and processes to their appropriate level of development and ability in preparation for secondary school.
4. Saint Joseph's N.S. will endeavour to educate each child at their own level, designing appropriate mathematical tasks for them that are suitable and possible within the classroom situation, taking account of different learning styles and abilities.
5. To provide children with positive, stimulating and interesting mathematical experiences which have application to everyday life.

Appropriate Language:

In relation to each of the strands of the curriculum:

Early Mathematical Activities (Infant level)

Number,

Algebra,

Shape and Space,

Measures,

Data,

We endeavour to standardise the language we use as teachers to describe various processes of thought and activity, especially in relation to the core concepts of number. We feel that by constant building throughout the student's time in the school, they will become familiar with the language associated with other key areas. We will be conscious of this and we will have a print

rich environment in our school. In this way we will introduce each child in their class group to a variety of mathematical expressions relevant to the development stage of each child/group.

As a staff we have decided to standardise the following language:

- **Place Value**… we will use the words '*units*' (instead of '*ones*') and each teacher will use the word 'digits' frequently.
- **Subtraction**… we will use the words *minus, less than, take away, subtract, take from*, *what is the difference between*. For sums involving subtraction, we have decided to start each sum at the top. This will begin in first class and will be reviewed as necessary.
- **Addition**… we will emphasise the words *total, altogether, plus, add, increase, more than, sum, total.*
- **Multiplication**… we will emphasise the words *multiply, times, by.*
- **Division**… we will emphasise the words *divide by, share, into.*

Calculators:

Calculators will be used on a phased basis **from Fourth class**, and each child will bring in their own calculator. They are useful in:

- Handling large numbers
- Checking answers
- Exploring the number system
- Removing computational barriers for some children thus enabling them to focus on the structure of the problem-solving questions at hand.

Children will be shown how to use them properly. It is important that the skill of estimation is developed along with the use of the calculator so that an incorrect calculation can be identified.

Tables:

It is school policy that each child who has the ability to do so, should develop the capacity to recall and be able to recite tables appropriate to their age level. These are to be constantly revised and checked by the class teacher.

In relation to classes the number **facts up to 12** should be learned on the following basis:

- 1st Class… Addition and Subtraction
- 2nd Class… Addition and Subtraction
- 3rd Class… Multiplication and Division
- 4th Class… Multiplication and Division
- 5th and 6th Classes… Revision of the above.

Methodologies:

As a staff we have decided to implement and adopt the methodologies outlined in the Teacher Guidelines from **page 30 onwards**. We will emphasise the '*active learning*' approach coupled with the '*hands-on approach*' encouraging the use of concrete materials, whenever possible. We will be aware of the need to discuss (rather than just teacher/pupil question and answer), theorise, hypothesise, tackle, measure, estimate, calculate, check, etc. We will be aware of the need to teach the children the skills involved in such discussions such as turn-taking, respecting other people's ideas and opinions and so on.

Textbooks:

The textbook will provide a valuable support for the different strand areas of the curriculum. Shadow books and testing apparatus may be 'dipped into' as needs arise. Having reviewed all of the available books on the Irish market we have decided to use the **'Busy at Maths'** series.

Assessment Procedures:

- Teacher designed tasks and tests: following up on various areas strand units and tests.
- Diagnostic test results: if a teacher has a worry about a specific child's response to an area, topic or concept, they can, in conjunction with the Resource or Learning Support Teacher, prescribe specific testing and analysing of a child's errors. This should help in planning further units of work.
- Standardised testing using the '*Sigma T*' will take place in May of each year.
- Records will be retained in teacher's assessment folders or in individual childrens' folders as required.

Maths Homework:

Homework will be used to re-enforce work done in school where the pupil can use some of the skills learned at school in his own environment. Homework tasks should be realistic, practical and relevant.

Timetabling:

Maths will be taught for a minimum of 4 hours and 10 minutes per week in the senior classes and for 3 hours 25 minutes in the infant classes.

Differentiation:

This Mathematics programme aims to meet the needs of all the children in the school. This will be achieved by teachers varying the pace, content and methodologies to ensure learning for all pupils. This will be recorded in the teacher's yearly notes.

The requirements of children with special needs will be taken into account when planning class lessons and related activities. The S.N.A. supports particular children and groups as directed by the class teacher. Children who experience bereavement and loss, serious illness, or other major personal situations are supported and consideration is given to meeting their individual needs in the most appropriate manner.

Implementation & Review

The implementation of the School Plan is supported by all staff and the BOM of St. Joseph's N.S. It will be reviewed as necessary.

Appendices

1. Subtraction & Re-grouping
2. Problem Solving
3. Maths Trail
4. Number Operations
5. Maths Resources / equipment
6. Thinking Strategies and Addition Facts (Tables)
7. Thinking strategies and Multiplication Facts (tables)
8. Calculator Activities
9. Useful Mathematical Websites
10. Overview of the Maths Curriculum – planning for teachers by strand
11. Glossary of mathematical terms to support the Mathematics Primary School Curriculum

Appendix 1: Subtraction with Regrouping.

When subtracting, or taking away, all pupils, parents and teachers are requested to use the following agreed wording.

	T	U
	5	1
-	2	3

51 take away 23 or 51 minus 23
We begin with the unit side.

RULE: always start at the top.

1 take away 3 we cannot do
So we rename a 10 from the 10's side

How many tens do we have now? 4
How many units do we have now? 11

	T	U
	4	1
	~~5~~	1
-	2	3

(Remember to begin with the units)
11 take away 3. What does that leave?
11 take away 3 leaves 8
(Now subtract the tens)
4 take away 2. What does that leave?
4 take away 2 leaves 2

	T	U
	4	1
	~~5~~	1
-	2	3
	2	8

We had 51 and we took away 23
Now what have we left?
We have 28 left.

Appendix 2: Problem Solving

What is a problem?

A task is perceived as a problem when the pupil is uncertain about its solution. The ability to solve problems is at the heart of maths. Maths is only useful to the extent to which it can be applied to a particular situation and it is the ability to apply maths to a variety of situations to which we give the name 'problem solving'.

Types of Problems:

- Word problems
- Practical tasks
- Open-ended investigations
- Puzzles
- Games
- Projects
- Mathematical trails

Strategies used / available:

- Making an estimate
- Constructing a model
- Drawing a diagram
- Making a chart or table of information
- Look for patterns in a problem
- Make a guess and test it out
- Breaking a problem down and solving each part
- Write a number sequence for the problem
- Use appropriate materials
- Solve a simpler version of the problem
- Act out a problem
- RUCSAC approach to problem solving

Appendix 3: MATHS TRAIL

What is a maths trail? A way of using the environment to explore some maths.

Why do a maths trail? Fun and enjoyment; To see some mathematic s in the environment; To encourage observation. As starting points for classroom activities; For its cross curricular possibilities; Maths trails are mentioned in the non-statutory guidance!

Where can a maths trail be set up?
School (classroom, hall, gym, library, corridor, school ground etc.); Local vicinity, village, part of town or city, shopping centre, park, countryside, Church, cathedral, Museums, stately homes etc.

In considering the venue for your trail you may need to think about
How busy will the area be at times when children will be on the trail? Are the features you want the children to look for easily seen at these times? Is it safe for your children? Is there sufficient space for all your children? Does it need to be traffic free? Could the number of children in such an area cause a nuisance to other people?

How can it be organised?
Is it going to be a trail suitable for various age and ability ranges? If so, you may need to choose objects or places where different levels of questioning would b possible. Will the whole class do the trail at the same time or not? Will the children work individually or in pairs or in groups…? Is it going to be a trail which is completed in one "go" or one which could be split into several sections? Are you going to use other teachers, parents, helpers?

How can it be presented?
A series of questions in the order in which they must be done? Direct instructions of where to go to next? Clues about where to go next? A map or plan? Path drawn in or areas marked in some way? Questions which can be attempted in any order? Answers written on the sheet/booklet or on a separate piece of paper?

What types of questions are you going to ask?
All of which can be answered "on trail" Some questions or ideas taken back to be developed further? Some starting points for activities? Closed questions, open questions or a mixture? Questions which deal with various aspects of maths? (Is it important to have a variety?) Could the children to think of some questions themselves? When are you going to ask them to do this? Questions which ask the children to "collect" things whilst on the trail?

How do you organise helpers? What will you expect of them? Will they work alongside the children, will they support the children or will they merely act as adult supervisors? Will you meet with them beforehand?

Other considerations: Transport arrangements; The things children will need on the trail e.g. writing materials, a bag in which to collect items; Insurance, parental consent.

Appendix 4: Number Operations and Language

+

addition
total
sum of
increase
add
and
more than

-

subtraction
decrease
subtract
take away
difference
less than
minus

X

multiplication
multiply
times
of
product of
power of
square

÷

division
divide
split
group
share
how many
give

=

Equals
means
will be
Is
represents
answer is
Same as

Appendix 5: Maths Materials

Early Maths Activities
Sorting Animals/Trays
Bears
Links
Beads
Pegs and Pegboards
Interlocking Cubes
Buttons (varying holes)
Matching Games
Magnetic Numbers
Dice
Number Lines
Dominoes
Sorting vehicles
Dienes Blocks
Cuisenaire Rods
Pattern Blocks
Logic Attribute Blocks
Tangrams
3D shapes/polygons
Shape puzzles
Geoboards
Dot/Isometric Paper
Construction blocks
Counters
Lollipop sticks
Number fans
Flashcards
Shape and space strand
2D shapes
3D shapes
Construction Straws
Pattern blocks
Geoboards
Nets of 3D shapes
Geostrips
Tangrams
Pentominoes
Measures strand
Balancing scales
Electric scales
Plastic weights
Dominoes
Empty containers for measuring
Plastic money
Large and small clocks
Trundle wheels
Metre sticks
Counting sticks

Number Strand
Dice
Unifix cubes
Number Lines
Place value boards
Dienes blocks
Counters
100 squares
Lollipop sticks
Interlocking cubes
Dominoes
Games
Calculators
Number fans
Playing cards
Cuisenaire rods
Fraction walls

Algebra Strand
Peg boards
Directed Number lines
100 squares

Appendix 6: Thinking Strategies & Addition Facts (Tables)

Add 0, 1, 2
Counting on: Children can count on 1 or 2 more without overloading their memory

Commutative Property:
e.g., 2+3 = 3+2
Children need to understand the commutative property of addition.

Adding 10
e.g., 10+6, 10+8 etc.

Subtraction
is the inverse of addition

Doubles
e.g., 5+5, 8+8, 4+4
It is very important for children to know their doubles in order to allow work to be done on near doubles. This is also a good forerunner to multiplication.

Near doubles
This is any sum, which is one way from being a double sum.
e.g., 8+9, 4+3 etc.

Facts of ten*
e.g. the numbers that make 10: 6+4, 3+7, 9+1 etc.

Adding to 9*:
One less than 10

Through10*
Also called bridging the ten

*The ten frame can be used to teach these three groups.

Appendix 7: Thinking Strategies & Multiplication Facts (Tables)

Repeated Addition

Get the children to make up 3 groups of 5 using cubes. 5+5+5=15 or groups of 5 is 15

Skip counting

This can be done concretely on the number line or the hundred square before moving towards oral work.

Commutative property

e.g., 4x6=6x4

Doubles

Doubles in the multiplication tables means 2x2, 6x6, 9x9 etc.

One set more/less

This is a great way to teach 6/4 times tables but the fact of 5 must be taught first.
Therefore, when introducing the 6 times tables they are introduced as one set more than 5, i.e., 5 times 8 is 40 so 6 times 8 is 40+8. In the same way the four times tables can be introduced as on set less.

10's tables to teach 9's

9 groups of a number is one set less than 10 groups of the number, i.e. 9x8 is the same as 80-8.

Twice a known Fact

4x7; 2 seven is 14 so twice as much is 28. This can be a useful way of teaching parts of the 4, 8 and 6 times tables.

Appendix 8: Calculator Activities

Number Patterns (Multiplication and Division)

Multiplication

Enter 6; Press +; Press =; The multiples of 6 should come up

Division

Enter 72; Press –; Enter 8; 72 should be reduced by 8 each times. This will also go into negative numbers.

Wipe out

Key in 8476. Wipe out in order starting with the units.
How did you wipe out the 6 units? What number have you now got?
How will you wipe out the 7? What numbers have you got? Etc.

Zap the Digit

Key in 764. Reduce the number to 0 in any order you like. Compare your method with the person beside you.

Oral Maths & Estimation Skills

Key in 764. Change this number to 28
(a) Change this number any way you like using any numbers/operations.
(b) Change using the fewest keys possible.

No More or Less

Pick a start number 3 5 8 10; Pick and end number 0 30 75; Try to reach it in 4 steps, no more, no less. Use your calculator to check your answer.

Hit the Target

Think of a two digit "target" number. What two numbers can be added together to make the target number. 98 (45+53) (40+58) (30+68)

Two Tries

Pick a target number from the following 1500,2000,3500,4000,5500
Select 4 digits. Rearrange the digits to get close to your target number when you multiply.
__x_____=1500 Check your answer on the calculator.

Broken Key

The 9 key is broken. Complete this sum on the calculator without using the broken key. 24 x 4 =

Multiplication Target

Using only these keys 2,3, X =. Target (reach) these numbers 6,8,9,36

Hat Trick

Estimate which sum matches the answer. 16 X 4; 19 X 3; 24 X 5; 120 64 47

Developing estimation skills

Play a version of the numbers game from 'Countdown'. Give the pupils a range of numbers and ask them to reach a certain target.

Number sense

2,3,6,8,12 reach 60 using all numbers, using some members, any, some, no operations

Checking calculations

$$\begin{array}{r} 25 \\ \underline{\times 34} \\ 100 \\ \underline{+750} \\ 850 \end{array}$$

Appendix 9: Useful Mathematics websites

www.education.ie
www.ncca.ie
www.mathematicsisfun.net
www.seomraranga.com
www.aaamath.com
www.puzzlemaker.com
www.funbrain.com
www.adrianbruce.com
www.schoolhub.com
www.teachingideas.co.uk
www.schooldiscovery.com
www.scoilnet.ie
www.bbc.co.uk
www.sums.co.uk
www.counton.org
www.atschool.co.uk
www.schooldays.ie
www.primaryscience.ie
www.coolmathematics4kids.com
www.primarygames.com
www.multiplication.com
www.barryispuzzled.com
www.teachingandlearningresources.co.uk
www.boxofideas.org
www.apple.com
www.teachingideas.co.uk
www.educate.org.uk
www.senteacher.org
www.teachingtime.co.uk
http://www.foresteducation.org/resources/woodland_m_1122560070.pdf

Appendix 10: Overview of the Maths Curriculum – planning for teachers by strand

PLANNING FOR TEACHERS BY STRAND

Junior Infants:

Early mathematical activities
Classifying objects on the basis of 1 attribute,
Matching equivalent & non-equivalent sets,
Comparing objects according to length, width, height, weight, quantity, thickness or size Ordering objects according to length or height.

Number
Classifying, Matching, Comparing, Ordering
Counting objects 1-10
Compare equivalent and non-equivalent sets 1-5 by matching Order
sets of objects by number 1-5
Ordinal number; first and last
Read and write numerals 1-5
Combine sets – totals to 5
Estimate no. of objects 1-5 Solve
oral problems 0-5

Algebra
Identify, copy & extend patterns in colour, shape & size

Space and Shape
Patterns: copy and extend patterns
Spatial awareness: over, under, up, down, on, beside, in,
2D shapes: square, circle, triangle, and rectangle- 2 shapes to make a square. Construct using *3D shapes* - roll, do not roll, fit together, don't fit

Measures
Developing an understanding of the concept of length/weight through exploration, discussion and use of appropriate vocabulary.
Compare and order objects according to length/height/weight.
Estimate and measure weight and length in non-standard units, e.g. "how many matchsticks fit along the table?"
Length: long, short, wide, narrow, longer, shorter, tall, wider than
Weight: heavy, light, - full, empty, nearly, holds more, holds less,
Time: morning, evening, night, day, lunchtime, bedtime, early, late, weekends etc.
Money: recognise and use coins up to 5cent, buy sell, coins, how much?

Data
Data: Match sets, equal, unequal, sort & classify sets of objects, interpret and represent data- more, enough, less as many as.

Senior Infants:

Number
Counting objects 0 – 20
Compare equivalent and non-equivalent sets 0-10 by matching Order

sets of objects by number 0-10
Ordinal number: first, second, third, last
Explore components of number 1-10
Combine sets totals –10, use + and = Read and write numerals 1-10 Estimate no. of objects 2-10
Solve oral problems 0-10

Algebra
Patterns: making and recognising patterns of 10
Predict subsequent numbers
Find missing numbers,
Identify copy and extend patterns in colour, shape, size and number (3-4 elements) Discover different arrays of the same number

Shape and Space
Position: above, below, near, far, right, left,
3D shapes: cube, cuboid, sphere, cylinder, edge, corner, face, straight, curved, round, flat, corner, combine 3D shapes to make other shapes, solve tasks and problems involving other shapes
2D shapes: square, circle, triangle, rectangle, straight, curved, flat, corner, side, combine and divide 2D shapes to make larger and smaller shapes, solve problems involving shape and space, give simple moving and turning directions.

Measures
Developing an understanding of the concept of length/weight through exploration, discussion and use of appropriate vocabulary.
Compare and order objects according to length/height/weight.
Estimate and measure weight and length in non-standard units, e.g. "how many matchsticks fit along the table?"
Length: as long as, wide as, longest, and shortest. Estimate Weight- weigh in non- standard units using balance
Capacity: guess/estimate
Time: yesterday, today, tomorrow, seasons, soon, not yet. Read time in 1-hour intervals.
Money: recognise coins to 20 cents and use coins to 10 cents.

Data
Data: represent and interpret data in 2 rows or columns using real objects, models & pictures
Sort and classify sets of objects by one and two criteria

<u>First Class:</u>

Number
Count the number of objects in a set
Estimate number of objects in a set 0-20
Read, write, order numerals 0-99 Ordinal
numbers first to tenth
Compare equivalent and non-equivalent sets 0-20
Record place value 0-99
Addition: Develop and apply commutative, associative, zero properties of addition Develop/Recall mental strategies for addition facts within 20
Construct number sentences/number stories- addition problems within 20 Add
numbers with/without renaming -99
Counting in twos, fives, tens
Subtraction: deducting, complementing, difference

Develop mental strategies for subtraction 0-20

Number stories/sentences sub. 0-20 Subtract numbers
within 99 without renaming Symbols +, =
Solve 1 step problems using addition/subtraction
Fractions: identify/establish ½ of sets to 20

Algebra
Pattern; odd and even numbers and use of number frame
Spatial awareness: vocabulary- between, on top of, around, through, left, right. Follow simple directions within classroom
Explore and use pattern in addition facts

Shape and Space
2D shapes: square, rectangle, triangle, circle, semicircle, sides size, corners, number and length of sides. Use of 2D shapes in classroom
3D shapes: cube, cuboid, cylinder, sphere Explore
relationship between 2D and 3D shapes
Between, underneath, on top of, around, through, left and right

Measures
Length: estimate, compare and measure, record length using non-standard units and standard unit- metre. Suggest ways of comparing objects. Solve and complete practical tasks and problems involving length
Vocab: length, width, height, measure, metre, nearly a metre, a bit less than a metre,
Weight: estimate; compare, measure and record.
Vocab: heavy, heavier, heaviest, light, lighter and lightest, balance
Use kilogram – measure and record weights record weight using non-standard measures. Largest/ smallest packet that weighs 1kg. Solve simple problems.
Capacity: estimate, compare, measure, record using non-standard units- pour, fill, empty, holds more, less, or the same amount as
Use litre and solve simple problems
Time: vocabulary- days of week, months of year.
Read time in hours and half hours on 12-hour clock. Read day and month using calendar. *Money:* Recognise exchange and use coins to the value of 50 cent. Exchange a coin for others of equal value. How many items can be bought with a given sum.

Data
Data: represent concretely and pictorially, interpret data in 2/3/4 rows or columns using real objects, models and pictures.

<u>Second Class:</u>

Number
Count the number of objects in a set- estimate first. Estimate number of objects in a set 0-20
Read, write, order numerals 0-199
Ordinal numbers using the calendar
Compare equivalent and non-equivalent sets using < > = Use
language of ordinal number e.g. using the calendar Place value 0-
199
Addition: Develop, apply and explore commutative, associative zero properties of addition
Develop/Recall mental strategies for addition facts within 20
Construct number sentences/number stories- addition problems within 99

Add numbers with/without renaming –estimate simple sums < 99. Use multiples of 10 (36 + 10) (45+20) Repeated addition and group counting
Subtraction: deducting, complementing, difference. Develop and recall mental strategies for subtraction 0-20
Subtract numbers within 99 with / without renaming Symbols +, -, =, < > Solve
1/2 step problems using add/subtraction
Construct number sentences involving subtraction of whole numbers
Fractions: identify/establish ½ /¼ of sets to 20

Algebra
Pattern: odd and even numbers on 100 square and use of number frame Explore
and use patterns in addition facts
Recognise pattern and predict subsequent numbers

Shape and Space
Spatial awareness; give and follow simple directions within classroom Explore,
discuss, develop and use vocabulary of spatial relations.
2D shapes: square, rectangle, triangle, circle, oval
semi-circle. Compare/Contrast Construct/ Use of 2D shapes in classroom, combine and partition 2 D shapes
Identify and discuss the use of 2D shapes in the environment
Describe, compare and name 3D shapes including cube, cuboid, cylinder, sphere, cone. Draw 3D shapes
Explore relationship between 2D and 3D shapes
Discuss the use of 3D shapes in the environment
Solve and complete practical tasks and problems involving 2D and 3D shapes.
Symmetry: identify line symmetry in shapes and in the environment
Angles: Explore and recognise angles in the environment- things that turn, wheels, half and quarter turns in hall or yard

Measures
Length: estimate, measure, record length using non-standard units and standard units- metre/centimetre. Explore relationship between metre and cm. Suggest ways of comparing objects. Height of each Pupil shortest/tallest
Solve practical tasks and problems involving length.
Area: estimate and measure using non-standard measures. Discuss and record.
Weight: estimate; compare measure, record weight using non-standard measures.
Kg and ½ kg and ¼ kg. Graph weights of fictional children. (sacks, suitcases) Avoid weighing pupils in class.
Use pan balance, kitchen scales, bathroom scales
Capacity: litre, ½ litre and ¼ litre containers
Time: read time in hours and half-hours on the digital clock. Read time in hours, half hours and quarter hours on the 12-hour analogue clock
Read day and month using calendar and identify season.
Money: Recognise exchange and use coins to the value of 2 euro. Exchange a coin for others of equal value. How many items can be bought with a given sum? Record money amounts as cents and later euro.

Data
Data: represent, read, and interpret simple tables and charts and block graphs. Progress to drawing on squared paper.
Sort and classify objects by 2/3 criteria.

Third Class:

Number

Place value: explore and identify place value 0-999. Significance of 0. Read, write, and order 3 digit numbers and solve simple problem. Round whole numbers to nearest ten /hundred. Explore and identify place value in decimal numbers to one decimal place.

Operations: Add/subtract with/without renaming within 999. Estimate sums and differences (rounding where necessary). Know and recall addition/subtraction facts. Solve word problems.

Multiplication as repeated addition etc. Understand and apply the zero commutative/distributive properties of multiplication. Develop and recall multiplication facts within 100. Multiply 1 or 2 digit number by 0-10. Round and estimate products. Represent in horizontal/vertical form. Multiply by 1 and 10.

Practical tasks and problems.

Division: Division as sharing /repeated subtraction with/without remainders. Divide 1/ 2- digit number by 1 digit. Record using the division algorithm. Estimate quotients and check answers. Rounding up or down -44 divided by 12 -about 40 divided by 10. Develop and recall division facts within 100. Solve practical tasks and problems.

Fractions: Identify fractions and equivalent fractions –denominators 2, 4, 8 and 10. Understand relationship between fractions and division. Calculate unit fraction of number and calculate a number.

Compare and order fractions with appropriate denominators and position on the numberline.

Calculate a fraction of a set using concrete materials. Develop an understanding of the relationship between fractions and division.

Solve and complete practical tasks and problems involving fractions.

Decimals: identify tenths, express in decimal form 1/10 as 0.1 order decimals on the number line. Identify the number with greatest value within a given set. Solve problems involving decimals.

Algebra

Number patterns and sequences: explore, recognise, and record patterns in numbers 0- 999.

Use pattern as an aid in memorisation of number facts. Make patterns on 100 sq. Explain rule for sequences.

Number sentences: translate addition/subtraction number sentence with a frame into word problem. Solve 1-step number sentences.

Shape and Space

2D shapes: square, rectangle, triangle, hexagon, circle, semicircle, oval, irregular shapes. Combine, tessellate and make patterns with 2D shapes. Solve and complete practical tasks and problems involving 2D shapes. Explore, describe and compare properties of 2D shapes.

Vocab: sides, angles, parallel and non-parallel lines.

Construct and draw 2d shapes. Make patterns. Identify these shapes in environment.

3D shapes: Cube, cuboid, cylinder, cone, sphere, triangular prism, and pyramid. Faces, edges, corners etc. Construct 3 D shape. Identify 3D shapes in the environment.

Explore and describe the relationship/ properties of 3D shapes with constituent 2D shapes. Solve and complete practical tasks and problems involving 2D and 3D shapes.

Symmetry: line symmetry in 2 dimensional shapes. Identify lines of symmetry in the environment in 2 D shapes.

Lines and angles: horizontal, vertical and parallel lines. Angles as greater than/ less than or equal to a right angle. Use right angle measure to identify right angles. Solve problems involving lines and angles.

Recognise an angle in terms of a rotation.

Measures

Length: estimate, compare, measure, record lengths in m. and cm. Rename cm. in m. and cm. Add/subtract metres and centimetres.
Solve and complete practical tasks and problems involving the addition and subtraction of units of length
Area: estimate, compare, measure regular and irregular shapes.
Weight: estimate, compare, measure, and record weight using kg. and g. Compare objects as an aid to estimation. Add/subtract using kg and g. Solve and complete practical tasks and problems involving weight.
Capacity: estimate, compare, measure, and record using l and ml.1 litre, 250 ml and 500 ml.
Add/subtract l and ml. Solve and complete practical tasks and problems involving this. *Time:* count in fives on number line and 100 sq. read time in 5 minute intervals on analogue and digital clock (12 hour) read and interpret simple timetables/calendars. Record time in analogue and digital forms. Refine and develop vocabulary of time.
Rename mins. as hours and hrs as mins. 70 mins = 1 hr 10 mins. Read dates from calendars. Express weeks as days. Consolidate and develop further sense of time passing.
Solve and complete practical tasks and problems involving this.
Money: rename amounts of euro or cents. Record using symbol and decimal point. Add/subtract euro and cents. Solve and complete practical tasks and problems involving this.

Data

Data: read and interpret tables, pictograms, block graphs and bar charts in intervals 1,2,5,10. Solve simple problems using collected data from own environment. Collect, organise and represent data using pictograms, block graphs and bar charts.
Chance: vocabulary- possible, impossible, might, certain, not sure. Identify and record outcomes of simple random processes.

<u>Fourth Class:</u>

Number

Place value: explore and identify place value 0-9999. Significance of 0. Read, write, order 4 digit numbers and solve simple problems. Round whole numbers to the nearest thousand. Identify place value in decimal numbers to two decimal places.
Operations: Add/subtract with/without renaming within 9999. Estimate sums and differences (rounding where necessary) check estimates with/without calculator. Know and recall addition/subtraction facts. Solve word problems-use calculator to develop problem-solving strategies and verify estimations.
Multiplication: Develop an understanding of multiplication as repeated addition and vice versa. Understand and apply the zero commutative/distributive/associative properties of multiplication. Develop and recall multiplication facts within 100. Multiply 2 /3digit
Number by 1 or 2 digit number. Use calculator to check estimates. Practical tasks and problems.
Division: Division as sharing /repeated subtraction with/without remainders. Divide 3-digit number by 1 digit. Use calculator to check estimates. Develop and recall division facts within 100. Solve practical tasks and problems.
Fractions: Identify fractions and equivalent fractions –denominators 2, 3, 4, 5,6,8, 9,10
and 12.

Compare and order fractions with appropriate denominators and position on the numberline.
Understand relationship between fractions and division. Calculate a fraction of a set using concrete material.
Calculate a number given a multiple fraction of the number. Express one number as a fraction of another number. Solve problems involving fractions.
Decimals: express tenths and hundredths as fractions and decimals. Identify place value of whole numbers and decimals to 2 decimal places. Order decimals on number line. Add/subtract whole numbers and decimals. Multiply/divide decimal number to 2 places by single digit whole number. Solve problems involving decimals.

Algebra
Number patterns and sequences: explore, recognise, extend, describe and record patterns in numbers 0-9999. Use pattern as an aid in memorisation of number facts. Make patterns on 100 sq. Explain rule for sequences.
Number sentences: translate add/subtraction/multiplication/division number sentence with a frame into word problem. Solve 1-step number sentences. Translate 1 step word problem into a number sentence.

Shape and Space
2D shapes: equilateral, isosceles, scalene triangle, parallelogram, rhombus, pentagon and octagon. Make patterns. Use ruler and set square to construct/draw 2D shapes.
Combine, tessellate and make patterns with 2D shapes
3D shapes: Cube, cuboid, cylinder, cone, sphere, triangular prism, and pyramid. Construct 3 D shapes.
Identify 3D shapes in the environment. Establish and appreciate that when prisms are sliced through in the same direction each face is equal in shape and size.
Explore and describe the relationship of 3D shapes with constituent 2D shapes. Solve and complete practical tasks and problems involving 2D and 3D shapes.
Symmetry: lines of symmetry as horizontal, vertical or diagonal. Use of line symmetry to complete missing half of a shape, picture or pattern.
Lines and angles: Identify, describe and classify oblique and perpendicular lines. Acute, obtuse and right angles. Solve problems involving lines and angles. Draw, discuss and describe intersecting lines and their angles. Classify angles as greater than, less than or equal to a right angle. Solve problems involving these.

Measures
Length: estimate, compare, measure, record lengths in appropriate metric units. Rename unit of length using decimal or fraction forms. Understand estimate and measure the perimeter of regular 2D shapes. Solve problems involving the addition, subtraction, multiplication and simple division of units of length (m, cm, km.)
Area: estimate, compare, measure regular and irregular shapes. Use standard square unit's sq cm, sq m.
Weight: estimate, compare, measure, record weight using kg. and g. become familiar with 100g markings, ½ kg, ¼ kg. Rename in kg and g and use decimal or fraction form (2 decimal places). Add/Subtract/Multiply/Divide kg and g. Selecting suitable instruments of measurement.
Solve problems involving this.
Capacity: estimate, compare, measure, record using l and ml.100 ml, ½ l, ¼ l. Select suitable instruments of measurement. Rename units of capacity using decimals and fractions. Add/subtract/multiply/divide l and ml.
Solve problems involving this.

Time: read time in 1-minute intervals on analogue and digital clock (12 hour). Express digital time as analogue and vice versa. Consolidate and develop further a sense of time passing.
Read and interpret simple timetables/calendars. Rename mins. as hours and hrs as mins. Add/subtract hours and mins.
Solve problems involving this.
Money: rename amounts of money as euro or cents using euro sign and decimal point. Add/subtract/multiply/divide euro and cents.
Solve problems involving this.

Data
Data: collect, organise, represent data using pictograms, block graphs, bar charts, and bar line graphs using scales- 1:2, 1:5, 1:10, and 1:100.
Read/interpret bar line graphs and simple pie charts using ½, 1/3, ¼. Solve problems involving this.
Chance: vocabulary- chance, likely, unlikely, never, definitely. Identify and record outcomes of simple random processes.
Order events in terms of likelihood of occurrence

<u>Fifth Class:</u>

Number
Place value: read, write, order whole numbers and decimals. Identify place value in whole numbers and decimals. Round whole numbers to nearest 10,100, 1000 and round decimals to nearest whole number.
Operations: estimate sums, differences, products and quotients of whole numbers. Front- end estimation, rounding, clustering, special numbers.
Estimate calculations and check with calculator. Add/subtract whole numbers and decimals to 3 decimal places with/without calculator. Multiply a decimal- to 3 places by a whole number with/without calculator. Divide 3-digit number by 2-digit number with/without calculator. Divide decimal number by whole number with /without calculator.
Fractions: Compare, identify and order fractions with denominators 2-12. Express improper fractions as mixed numbers and vice versa and position on number line. Add/subtract simple fractions and simple mixed numbers. Use equivalent fractions to simplify calculations.
Multiply a fraction by a whole number. Express tenths, hundredths, and thousandths in both fractional and decimal form. Express improper fractions as mixed numbers and vice versa and position them on the numberline.
Decimals and percentages: understand simple percentages and relate them to fractions and decimals. Calculate simple percentages e.g. 50%, 25% 10%. Compare and order fractions and decimals. Solve problems using whole numbers, fractions, decimals and simple percentages.
Number theory: identify simple and composite numbers. Identify square and rectangular numbers. Identify factors and multiples.

Algebra
Directed numbers: identify positive and negative numbers in context.
Rules and properties: explore and discuss properties and rules about brackets and priority of operation. Compute expressions with brackets in a variety of positions. Significance of position of brackets. Identify relationships and record verbal and simple symbolic rules for number patterns. (B.O.M.D.A.S.)
Equations: translate number sentences with a frame into word problems and vice versa. Solve 1 step number sentences and equations.

Shape and Space

2D shapes: make informal deductions about 2D shapes and their properties. Size and number of angles, type and number of sides e.g. trapezium, scalene triangle, regular hexagon. Identify properties of the circle. Construct a circle of given radius or diameter- using a compass. Tessellate combinations of 2D shapes. Explore, compare, record lines of symmetry in 2D shapes. Make a specified shape with tangram shapes. Solve problems involving this.

3D shapes: Identify and examine 3D shapes and explore relationships including tetrahedron (faces, edges and vertices.)

Explore, compare and record number of faces of 3D shapes. Draw nets of simple 3D shapes. Construct 3D shapes from nets.

Lines and angles: Recognise, classify and describe angles and relate them to shape and the environment.

Measure and record angles as acute, obtuse, reflex, or right angles. Determine the number of such angles in relation to common regular shapes. Recognise angles in terms of rotation. Estimate, measure and construct angles in degrees. Explore sum of angles in a triangle. Measure using a protractor.

Measures

Length: Select and use appropriate instruments of length.

Use ruler for short objects, metre stick for longer distances/objects, trundle wheel for distances. Estimate and measure length using appropriate metric units. Use mm, cm, m, km. Estimate and measure perimeter of regular/irregular shapes.

Discover area of rectangle is length by breadth. Measure area of regular/irregular shapes using square centimetres and square metres. Compare sq metres and sq centimetres.

Weight: Select and use appropriate instruments of measurement.

Use balance, kitchen scales, bathroom scales, spring balance. Estimate and measure weight using appropriate metric measures- grams and kilograms.

Capacity: Select and use appropriate instruments of measurement.

Use graduated jugs, litre containers. Millilitres- cups, litres- watering can. Estimate and measure.

Time: read and interpret timetables and the 24-hour clock-digital and analogue. Interpret and convert between times in 12 hour and 24 hour format.

Money: Compare value for money using unitary method.

Data

Data: use pictograms, single and multiple bar charts and simple pie charts. Compile and use simple data sets. Explore and calculate averages of simple data sets. Use data sets to solve problems.

Chance: list all possible outcomes of simple random processes. Estimate the likelihood of occurrence of events. Construct and use frequency charts and tables.

<u>Sixth Class:</u>

Number

Place value: read, write, order whole numbers and decimals. Identify place value in whole numbers and decimals. Round decimals to 1/2/3 decimal places.

Operations: estimate sums, differences, product, quotients of decimals. Use strategies for estimation. Add/Subtract whole numbers and decimals to 3 decimal places with/without calculator. Multiply decimal-by-decimal with/without calculator. Divide 4-digit number by 2-digit number with/without calculator. Divide decimal number by decimal with/without calculator. Division does not always make smaller.

Fractions: compare and order fractions, identify equivalent forms of fractions. Express improper fractions as mixed numbers and vice versa and position on number line.

Add/Subtract simple fractions and simple mixed numbers. Common denominator should be found by listing multiples. Multiply fraction by fraction. Express tenths, hundredths, and thousandths in both fractional and decimal form.
Divide a whole number by a unit fraction. Understand and use simple ratios.
Decimals and percentages: use percentages and relate them to fractions and decimals. Express quantities as percentages. Compare and order percentages of numbers. Solve problems relating to profit and loss, discount, VAT, interest, increases, decreases.
Number theory: identify simple prime and composite numbers. Identify and explore square numbers. Explore and identify simple square roots. Identify common factors and multiples. Write whole numbers in exponential form.

Algebra
Directed numbers: identify positive and negative numbers on the number line. Add simple positive and negative numbers on the number line.
Rules and properties: Know simple properties and rules about brackets and priority of operation. (B.O.M.D.A.S.) Use calculator in exercises to find missing numerals. Identify relationships and record symbolic rules for number patterns.
Variables: Explore the concept of a variable in the context of simple patterns, tables, simple formulae, and substitute values for variables.
Equations: translate word problems with a variable into number sentences. Solve 1 step number sentences and equations.

Shape and Space
2D shapes: make informal deductions about 2D shapes and their properties. Use angle and line properties to classify and describe triangles and quadrilaterals. Construct triangles from given sides or angles. Identify properties of the circle. Construct circle of given radius or diameter. Tessellate combinations of 2D shapes. Use geoboards and squared paper. Plot simple coordinates and apply where appropriate.
Classify 2D shapes according to their lines of symmetry. Solve
problems using this.
3D shapes: identify, examine 3D shapes, including octahedron, explore relationships, including faces, edges, and vertices. Draw the nets of simple 3D shapes and construct the shapes.
Lines and angles: Recognise, classify and describe angles and relate angles to shapes. Identify types of angles in the environment. Recognise angles in terms of a rotation. Estimate, measure, construct angles in degrees. Explore sum of angles in a quadrilateral.

Measures
Length: select and use appropriate instruments of measurement. Rename measures of length. Express results as fractions and decimal fractions.
Recognise /Estimate/Measure perimeter of regular and irregular shapes.
Area: recognise that the length of the perimeter of a rectangular shape does not determine the area of the shape.
Use and interpret scales on maps and plans. Calculate area of regular/irregular shapes. Measure surface of specified 3D shapes. Use acres and hectares for fields, playgrounds, car parks. Find area of a room from a scale plan.
Weight: Select and use appropriate instruments of measurement. Rename measures of weight as fractions or decimals of appropriate metric units.
Capacity: Select and use appropriate instruments of measurement. Rename measures of capacity as fractions or decimals of appropriate metric unit. Find volume of cuboid experimentally.
Time: explore international time zones. Explore relationship between time, distance and average speed.

Money: Explore value for money. Calculate sale prices. VAT. Convert other currencies to euro and vice versa.

Data

Data: Read and interpret trend graphs and pie charts. Compile and use simple data sets. Collect, organise and represent data using Pie Charts and Trend graphs.
Explore and calculate averages of simple data sets. Use data sets to solve problems. *Chance:* Identify and list all possible outcomes of simple random processes. Estimate the likelihood of occurrence of events; order on a scale from 0 to 100%, 0 to 1. Construct and use frequency charts and tables.

The following numbers are recommended. However, this will be differentiated according to the needs of the pupils within each class. In our experience some pupils in St. Joseph's N.S. exceed the minimum curriculum requirements particularly at Junior level.

Class	Numerals
Junior Infants	0 - 5
Senior Infants	6 - 10
1st Class	to 99
2nd Class	to 199
3rd Class	to 999
4th Class	to 9999
5th Class	99,999
6th Class	million

Appendix 11: Glossary of mathematical terms to support the Mathematics Primary School Curriculum

Glossary

These descriptions are intended to be a help to primary teachers and are not necessarily the full mathematical definitions of the term.

algorithm	a logical, arithmetical or computational procedure that, if correctly applied, ensures the solution of a problem
analogue clock	a clock on which hours, minutes and sometimes seconds are indicated by hands on a dial
are	a unit of area equal to 100 square metres
associative	an operation such as multiplication or addition is associative if the same answer is produced regardless of the order in which the elements are grouped, e.g.(2 +3) + 5 = 10, 2 + (3 + 5) = 10
cardinal number	a number denoting quantity but not order in a set
commutative	giving the same result irrespective of the order of the elements in addition and multiplication 6 + 2 =8 2 + 6 = 8, 5X7=35 7X5=35
composite number	a number with more than two factors that is not a prime number, e.g. 6, 10
denominator	the divisor in a fraction
diameter	a straight line connecting the centre of a circle with two points on the perimeter
distributive	the same result is produced when multiplication is performed on a set of numbers as when performed on the members of the set individually, e.g. 5 x 4 = (3 + 2) x 4 = (3 x 4) + (2 x 4)
dividend	a number or quantity to be divided by another number or quantity divisor
	a number or quantity to be divided into another number or quantity
equation	a mathematical sentence with an equals sign
hectare	a unit of area equal to 100 ares
line symmetry	a shape has line symmetry if one half of the shape can be folded exactly onto the other half

Number sentence	an equation or statement of inequality
numerator	the number above the line in a fraction
ordinal number	a number denoting relative position in a sequence, e.g. first, second, third
perimeter	the sum of the length of the sides of a figure or shape
prime factor	a factor that is a prime number
prime number	a whole number that has only two factors, itself and 1, e.g. 2, 3, 7
radius	a straight line from the centre of a circle to a point on the circumference; a radius is half the diameter
ratio	the relationship between two numbers of the same kind; e.g. the ratio of 2 kg to 6 kg is 2:6
subitise	tell at a glance, without counting, the number of items in a set
subtrahend	the number to be subtracted from another number, e.g. 10 - 4 (4 is the subtrahend)
tessellation	shapes tessellate if they fit together exactly, form a repeating pattern, and make an angle of 360 degree at the points of contact
variable	a letter or symbol that stands for a number, e.g. y + 7 = 12

B.O.M.D.A.S.	Brackets Order Multiplication Division Addition Subtraction
D.C.U.	Dublin City University
D.E.S.	Department of Education & Science
E.F.L.	English as a foreign language
I.C.T.	Information & Communication Technology
N.C.C.A.	National Council for Curriculum & Assessment
N.C.S.E.	National Council for Special Education
P.T.A.	Parent Teacher Association
S.E.N.	Special Educational Needs
S.E.T.	Special Education Teacher
S.N.A.	Special Needs Assistant
STen	Standard ten score
V.A.T.	Value Added Tax