



## **COMHAIRLE NAN EILEAN SIAR**

Department of Education and Children's Services  
Roinn an Fhoghlam agus Seirbheisean Chloinne

# **NUMERACY STRATEGY 0-18**

# Contents

## Foreword by Peter Carpenter, Director of Education and Children's Services

### 1. Introduction

- What is numeracy and why does it matter?

### 2. Overarching Aims

### 3. Roles and responsibilities: Local Authority

- 0-3 Age Group
- 3-5 Age Group
- Support for Learning Teachers
- Transition
- Learning Community

### 4. Roles and Responsibilities: Senior Management Team

#### Primary School Aged Children

- The Role of Class Teachers
- The Role of Support for Learning Teachers
- The Importance of Partnership Working
- Transition – Primary to Secondary

#### Secondary School Aged Children

- Headteachers
- The Role of Numeracy Co-ordinators
- The Role of Department/Faculty Principal Teachers
- The Role of Class Teachers
- The Role of Support for Learning in Secondary
- Transitions – Secondary to Employment/Further Education

### 5. Evaluating impact of the strategy

- Appendix 1 Features of an achieving learner – Early Level
- Appendix 2 Features of an achieving learner – First Level
- Appendix 3 Features of an achieving learner – Second Level
- Appendix 4 Features of an achieving learner – Third Level
- Appendix 5 Significant aspects of learning
- Appendix 6 Learning Conversations - Sample

- *\*CNES acknowledges the contribution of South Lanarkshire policy documents in providing the framework for this policy.*

## FOREWORD

I am pleased to endorse the Comhairle's Numeracy Strategy document for use in our school and pre-school establishments. Alongside the development of the 'Curriculum for Excellence' in recent years, it has been our responsibility also to maintain high levels of pupils' key skills in literacy and numeracy.

This strategy document will help schools to plan carefully and ensure the delivery of engaging and challenging activities. It will also facilitate the progressive development of skills and knowledge as our pupils move from one stage of their education to the next. When teachers are planning activities, regardless of the broad content, the development of core literacy and numeracy skills need to be considered and planned accordingly. Teachers, supported by this framework strategy, will be required to provide learning opportunities which promote speaking, listening, reading and writing skills as well as activities which support learning in key aspects of mathematics, particularly numeracy.

Schools are encouraged to appoint members of staff who will take a lead for Numeracy. This is important in order for us as an authority to identify best practice and identify schools and individual teachers that are successful in raising attainment.

I would like to thank all staff who have contributed to the development of this document. I believe it is key to ensuring improved outcomes for our pupils.

Peter Carpenter  
Director of Education and Children's Services  
Comhairle nan Eilean Siar

November 2013

## 1. INTRODUCTION

### What is numeracy and why does it matter?

*“We are numerate if we have developed:*

*the confidence and competence in using number which will allow individuals to solve problems, analyse information and make informed decisions based on calculations.”*

*“Being numerate helps us to function responsibly in everyday life and contribute effectively to society. It increases our opportunities within the world of work and establishes foundations which can be built upon through lifelong learning. Numeracy is not only a subset of mathematics; it is also a life skill which permeates and supports all areas of learning, allowing young people access to the wider curriculum.”*

*(Curriculum for Excellence; Numeracy across Learning, Principles and Practice, 2009)*

*“Mathematics is important in our everyday life, allowing us to make sense of the world around us and to manage our lives. Using mathematics enables us to model real-life situations and make connections and informed predictions. It equips us with the skills we need to interpret and analyse information, simplify and solve problems, assess risk and make informed decisions.”*

*“To face the challenges of the 21st century, each young person needs to have confidence in using mathematical skills, and Scotland needs both specialist mathematicians and a highly numerate population.”*

*Building the Curriculum 1*

## 2. OVERARCHING AIMS

The numeracy strategy sets the context for:

- improving levels of numeracy and attainment in mathematics;
- ensuring all children and young people experience a curriculum which is rich in good numeracy experiences and opportunities which promote better outcomes for children and young people;
- promoting partnership with parents/carers and other agencies in order to maximise shared knowledge and available resources;
- promoting early numeracy skills;
- ensuring a confident and effective workforce by building the capacity of all staff in all sectors to develop appropriate skills and knowledge;

## 3. ROLES AND RESPONSIBILITIES

### Local Authority

The Director and officers within the Education and Children’s Services Department have a strategic role in:

- promoting a shared vision so that there is a common aim for all;
- ensuring the implementation of the numeracy strategy and holding a strategic overview of developments and performance issues;
- promoting specific developments, within the overall framework of this strategy;
- fulfilling the requirements of the national numeracy strategy;
- promoting awareness of the importance of the development of numeracy skills;
- involving children, young people and their parents/carers in developments relating to the numeracy strategy;
- providing Continuing Professional Development (CPD) programmes to enable staff to deliver the outcomes set out in the strategy;
- promoting partnership working with parents/carers and providing information to enable them to support their children’s numeracy development;

- ensuring that children and young people, who face barriers to acquiring numeracy skills are identified, so that targeted support can be provided at the earliest possible point (early intervention);
- securing a range of services and maximising resources to support the development of numeracy skills;
- monitoring the attainment in numeracy of all children and young people to identify trends and take appropriate action to secure the best possible outcomes for all learners;
- promoting partnership working with other agencies to ensure that the full range of expertise can be made available to support learners who are experiencing difficulties with numeracy.

### **0-3 age group**

Within childcare centres, nursery managers have overall responsibility, supported by services within education, for an effective 0-3 curriculum. All staff have a responsibility for ensuring that the environment is rich in numeracy opportunities, that activities are well planned and of a high standard. Partners play a vital role in the 0-3 age group in supporting the development of babies and young children. Parent is Paiste and Parent and Toddler Groups are available in some areas. As many children do not attend a childcare setting under the age of 3, their main support link will be to services within the NHS e.g. public health practitioners and community paediatricians. Provision for parents/carers looking for childcare for their children under the age of 3 is varied and can include childminders and private or local authority nurseries. For this age group, effective collaboration and communication between all partners within the Getting It Right for Every Child (GIRFEC) framework and Pre-Birth to Three guidance is essential, and needs to focus on the provision of positive outcomes for children.

- Integrated Children's Services (ICS) will provide coordinated interventions for children and families, including advice regarding early play and learning experiences as well as supportive parenting practices.
- The area PTLs (Principal Teacher Learning Support) will provide support and advice for families and establishments from birth where appropriate
- The Psychological Service will provide advice, assessment and training support to early years establishments and parents/carers.
- All partners need to have a common understanding of the factors that promote early numeracy development, and a shared commitment to its promotion

### **3-5 age group**

Managers of partner providers, heads of centres and primary head teachers have overall responsibility, supported by services within education, for the delivery of an effective early years curriculum within the Curriculum for Excellence framework. All staff have the responsibility for ensuring the environment is rich in numeracy experiences and that opportunities are well planned and of a high standard.

- Management will identify a Numeracy Co-ordinator who will lead and give guidance to staff.
- Management will ensure appropriate and relevant CPD opportunities are available for all staff to ensure that they are knowledgeable and skilled in the delivery of effective numeracy experiences.
- Numeracy opportunities will be firmly embedded in children's play experiences to facilitate optimum learning.
- Staff will focus on assessment and gathering evidence on individual children to track their progress in numeracy.
- Establishments will use a range of approaches and resources to encourage and advise parents/carers as to how to engage with their children in ways that develop numeracy.
- Within the GIRFEC agenda, staff will liaise with all agencies to identify and support children who need additional support, through staged assessment and intervention.

### **Support for Learning Teachers**

- Area PTLs will provide support and advice to families of children with additional support needs.
- This support will continue when the child moves to nursery and includes advising nursery staff on appropriate interventions to support children's numeracy.
- On transition to P1, relevant information and advice on individual children will be shared with primary schools and, where appropriate, enhanced transitions are put in place.

## Transition

In order to ensure continuity and progression in children's numeracy, it is crucial that information passed on can be used to ensure a clear starting point for next steps.

- Early years establishments will have rigorous assessment approaches for gathering information on children's numeracy skills.
- Early years establishments will provide information to primary 1 teachers through the profile document that gives clear, concise information regarding children's pre and early numeracy skills.
- Primary 1 teachers will use information provided by early years establishments on individual children's early numeracy development to inform next steps in their numeracy.
- Partners will be involved in multi-agency information sharing and planning transitions for individual children with additional support needs. Parents/carers will be central to this process.

## Learning Community

At Learning Community level, staff will work together to achieve:

- progression and continuity in the development of numeracy skills at transitions;
- early and well-planned enhanced transitions, involving partner agencies as appropriate, for those experiencing difficulties/barriers to learning;
- shared understanding of standards and approaches through programmes of regular assessment and moderation of numeracy

## 4. ROLES AND RESPONSIBILITIES: SENIOR MANAGEMENT TEAM

### Primary school aged children

School Managers will:

- identify a member of staff with a lead responsibility for numeracy;
- ensure that developing numeracy is a priority in Improvement Plans, Forward Plans and around the school;
- ensure appropriate and relevant CPD opportunities are available for all staff;
- adopt a range of approaches to monitor and evaluate the provision of numeracy;
- develop models of sharing good practice throughout the school and within the learning community;
- ensure, in collaboration with the Learning Community Principal, there is a common understanding of standards across the learning community.

### The Role of Class Teachers

Developing numeracy skills is the core business of primary schools, therefore *all* teachers are leaders in numeracy and must:

- ensure the development of numeracy is carefully planned, indicating clear learning intentions and assessment focus to meet the needs of all learners;
- give learners opportunities to experience a range of learning and teaching strategies including collaborative and active learning and the use of Information and Communications Technology (ICT);
- plan for a range of assessment activities that allow children to demonstrate their learning in different contexts;
- maintain effective records of the ongoing assessment activities and observations in order to track pupil attainment;
- gather appropriate evidence (\*see Significant Aspects of Learning) to endorse professional judgement in each aspect of numeracy across the breadth, challenge and application of learning;
- demonstrate progress in numeracy in each child, moving from dealing with straightforward information towards analysing, evaluating and being aware of the trust they should place on data;
- use assessment information to inform next steps in planning and reporting on progress.

## Support for Learning Teachers

CNES operates a system of staged assessment and intervention throughout all the pre-school establishments and schools, in order to meet the additional support needs of children and young people from 3-18. The annual ASN Audit is used to allocate staffing and resources to schools to meet the needs within each pre-school/school. Support for Learning teachers support individual children, young people and schools to ensure access to the curriculum and the removal of barriers to learning.

Support for Learning teachers fulfil six key roles:

- providing advice to schools on appropriate intervention strategies and a range of available resources, including IT, to help meet pupils' needs and promote greater access to the curriculum;
- direct teaching of individual pupils and small groups, using focused educational programmes to develop and sustain numeracy skills;
- working in partnership with class teachers to promote inclusion and, through differentiation of materials and methods, support the learning of all children;
- providing a range of specialist services including assessment, liaison with Psychological Services and other agencies and supporting pupils across major transitions;
- being involved in partnership with schools in developing and supporting curricular initiatives aimed at improving numeracy;
- developing the skills of staff and providing tailored staff training in schools

## The Importance of Partnership Working

The development of strong numeracy skills is crucial to lifelong learning. Managers and practitioners, therefore, need to apply the principles of the GIRFEC framework.

Partnership working is key to the success of GIRFEC. A range of partners may be involved at any time, including:

- Parents/Carers;
- Public Health Nurses/School Nurses;
- Home/School Partnership Workers;
- Learning Support Auxiliaries;
- Speech and Language Therapists and allied Health Professionals;
- Psychological Services;
- Integrated Children's Services;
- Social Work Resources;
- Voluntary Sector.

## Transition – primary to secondary

It is essential that all relevant information about numeracy is shared with the secondary school in a useful and effective way. It is also important that all those involved have a clear understanding of how they deliver numeracy and a shared understanding of standards.

This could be achieved through:

- secondary staff exploring opportunities for team teaching in primary schools (and vice versa) to develop an understanding of methodology being used in the different sectors;
- common approaches to teaching and learning, e.g. common numeracy strategies, use of the same self/peer-assessment methods etc.;
- programmes for learners across the sectors;
- detailed profiling from primary to secondary which includes all aspects of numeracy as well as achievements and learning needs with regard to which experiences and outcomes have and have not been met.

## Secondary school aged children and young people

### Head Teachers will:

- identify a member of SMT/staff with lead responsibility for numeracy;
- provide clear direction to staff;
- support the co-ordinator in audit, improvement planning and self-evaluation;
- ensure the commitment of all staff in addressing numeracy learning experiences in their courses;
- adopt a range of approaches to monitoring and evaluating provision;
- support staff in the provision of quality CPD and facilitate dissemination of good practice.

### The Role of Numeracy Co-ordinator

The development and promotion of numeracy is identified as a key responsibility for all teachers within the broad framework of Curriculum for Excellence. The role of the Numeracy Co-ordinator must complement this general responsibility. The Co-ordinator will demonstrate an enthusiasm for the promotion of numeracy in learning and have the commitment to support colleagues in ensuring that all learners and young people achieve positive numeracy outcomes. Where possible, time should be identified across the school year to support the work being done by the Co-ordinator.

The Numeracy Co-ordinator can undertake a number of tasks to support the development of numeracy. These may include some or all of the following:

- work closely with the Head Teacher to plan for implementation;
- coordinate the development of a school position statement for numeracy, which takes account of national and local authority guidelines;
- liaise with colleagues to identify current provision within the establishment;
- broaden their own CPD by attending local and national events;
- disseminate their learning by organising and leading CPD events within the establishments or, on occasion across the Learning Community;
- facilitate the sharing of good practice across departments and sectors;
- contribute to whole school improvement planning and self-evaluation processes.

### The Role of Department/Faculty Principal Teachers

All subject leaders will understand that:

- numeracy skills need to be addressed consistently and systematically across the curriculum;
- there should be a coherent approach to the development of numeracy skills;
- there should be an audit of numeracy outcomes and experiences, and these should be identified in the course programmes for the subject;
- departmental self-evaluation, using 'How Good Is Our School', will assist departments in ensuring that learners are consolidating their numeracy skills.

### The Role of Class Teachers

In reflecting on their practice, teachers will understand the importance of:

- collaborative and active learning to allow children to explore ideas and develop their thinking;
- learning being supported by good numeracy;
- developing numeracy skills as a shared responsibility, and that collaborative planning will improve the delivery;
- including a range of media which learners will access and will impact on their numeracy development;
- developing numeracy skills in real-life contexts;
- supporting the development of numeracy through ICT which can help in a number of ways;
- all teachers working with pupil support colleagues to ensure the needs of all learners are met;
- maintaining pupil profiles.

## **The Role of Support for Learning in Secondary**

Support for Learning staff can perform a crucial role in identifying the needs of learners and having plans in place to ensure numeracy development is coherent across all areas. This can be managed by:

- consulting with managers and teachers to plan and resource learning strategies to meet learners' needs;
- encouraging differentiation and the use of ICT;
- ensuring information on pupil progress is disseminated, including to parents/carers;
- sharing responsibility for classroom practice with teachers, including supporting individuals and groups;
- sharing learning and teaching approaches and strategies with colleagues;
- direct teaching of specific programmes to learners;
- being involved in CPD, both participation and delivery to staff;
- involving, where necessary, the range of specialist services to agree an Individualised Education Plan (IEP), or Co-ordinated Support Plan (CSP).

## **Transitions – Secondary to Employment/Further Education**

It is also important to ensure careful profiling for learners who are making the transition from school to post-school provision. This is particularly necessary for those who have identified numeracy needs; these young people need to be supported by the relevant adult education sector.

The following list includes those who may be involved in such transition.

- Parents/carers.
- Pupil Support staff.
- Relevant SMT with responsibility for S4/5/6.
- Skills Development Scotland.
- More Choices More Chances Co-ordinator.
- Partner agencies such as UHI, Lews Castle College, Extended Learning, Include us
- Local employers.

Increasingly, schools are measured, as much by the sustained positive destination statistics of learners as by attainment in SQA examinations. It is important to monitor that those who have left school are supported and, indeed, in positive destinations through the School Leavers' Destination Report, which is ultimately passed to the Scottish Government.

## **5. EVALUATING IMPACT OF THE STRATEGY**

The impact of the numeracy strategy will be evaluated in the following ways:

- annual analysis of PiM Standardised Assessment will identify trends in attainment;
- National Qualifications data, will be routinely reviewed in order to identify improvements and development needs in numeracy;
- Scottish Survey of Literacy and Numeracy (SSLN) will allow the Government to monitor the progress of learners' numeracy skills over time at national level at key points in primary and secondary schooling (P4, P7 and S2). It will be important to carry out a comparison between the national picture and that of Comhairle nan Eilean Siar.
- monitoring of Comhairle nan Eilean Siar HMIE reports will be carried out to help identify trends and effective practice in improving the numeracy skills of learners.

## Appendix 1 - Features of an achieving learner – Early Level

<p><b><u>Estimation &amp; Rounding</u></b></p> <p>An achieving learner can differentiate between different sized objects and amounts. They can make judgments and explain their reasoning.</p>	<p><b><u>Number &amp; Number Processes</u></b></p> <p>An achieving learner can identify numbers and their value by demonstrating counting, sequencing and ordering skills. They can confidently demonstrate the process of addition and subtraction and record their calculations appropriately.</p>	<p><b><u>Fractions, Decimal Fractions &amp; Percentages</u></b></p> <p>An achieving learner can demonstrate and apply their sharing skills in a range of practical situations, using whole objects and groups of objects.</p>	<p><b><u>Money</u></b></p> <p>An achieving learner can give examples of where and what money is used for in everyday life, identify coins and their associated values and apply their knowledge of money in realistic situations and are beginning to identify and recognise notes.</p>	<p><b><u>Time</u></b></p> <p>An achieving learner can recognise and demonstrate the passage of time by sequencing events and routines in order; identify and describe features of times of the day, days of the week, seasons and recognise months of the year. Learner can recognise, identify and use different methods of recording time and apply their knowledge of time in realistic situations.</p>
<p><b><u>Measurement</u></b></p> <p>An achieving learner can compare, calculate length, size, volume and weight using everyday items and demonstrate their understanding in a practical way. They can use appropriate language to discuss, explain their findings and apply their knowledge in familiar situations.</p>	<p><b><u>Early Level – An achieving learner can..</u></b></p> <ul style="list-style-type: none"> <li>• Demonstrate that they have achieved a breadth of learning across almost all of the experiences and outcomes for the level</li> <li>• Respond consistently well to the level of challenge set out in the experiences and outcomes</li> <li>• Move forward to more challenging learning in some aspects</li> <li>• Applied what they have learnt in new and unfamiliar situations</li> </ul>			<p><b><u>Patterns &amp; Relationships</u></b></p> <p>An achieving learner can identify continue, copy and create patterns in the own and the wider environment.</p>
<p><b><u>Properties of 2D &amp; 3D Objects</u></b></p> <p>An achieving learner can identify and describe 2D and 3D objects and using the names of these, correctly identify everyday items and engage with them creatively.</p>	<p><b><u>Angle, Symmetry &amp; Transformation</u></b></p> <p>An achieving learner can recognise symmetrical patterns in the world around them and use a variety of media to create these. They can use and understand directional and positional language in movement, games and technology and apply this knowledge in everyday situations</p>			<p><b><u>Data &amp; Analysis</u></b></p> <p>An achieving learner can select and justify appropriate criteria to collect and organise relevant information. They can translate information into meaningful displays and discuss findings with others. They can interpret and use signs and charts in the world around us</p>

## Appendix 2 – Features of an achieving learner – First Level

<p><b><u>Estimation &amp; Rounding</u></b></p> <p>Identify and apply estimation strategies appropriate to problems in a variety of contexts, explain their method to others and check and compare the estimate to an actual answer.</p>	<p><b><u>Number &amp; Number Processes</u></b></p> <p>Consistently apply knowledge of how whole numbers are constructed in a variety of situations. Learners can apply understanding of place values and the importance of zero as a place holder when using the four operations, learners can apply appropriate mental strategies and written skills to solve number problems.</p>	<p><b><u>Fractions, Decimal Fractions and Percentages</u></b></p> <p>Demonstrate and explain their understanding of fractions and their equivalence using the correct vocabulary and notation. A secure learner can recognise and apply the links with division to solve problems.</p>	<p><b><u>Money</u></b></p> <p>Demonstrate and explain their understanding of the value of different number of coins and notes in a variety of ways and apply appropriate strategies to calculate totals and change.</p>	<p><b><u>Time</u></b></p> <p>Accurately tell the time in both analogue and digital formats. Learners can confidently apply these skills to plan and organise key events in their daily lives. Learners can formulate realistic estimates to measure durations of time.</p>
<p><b><u>Measurement</u></b></p> <p>Make an informed estimate and accurately measure the length weight, volume and area of an object in a variety of contexts. They can apply strategies to select appropriate methods, instruments and units. They can use appropriate language to explain their choices.</p>	<p><b><u>First Level - An achieving learner can....</u></b></p> <ul style="list-style-type: none"> <li>• Demonstrate they have achieved a breadth of learning across almost all of the experiences and outcomes for the level.</li> <li>• Respond consistently well to the level of challenge set out in the experiences and outcomes</li> <li>• Move forward to more challenging learning in some aspects</li> <li>• Applied what they have learnt in new and unfamiliar situations</li> </ul>			<p><b><u>Mathematics – Its impact on the world past and present.</u></b></p> <p>Identify and explain how numbers are used in everyday life and their purpose. The learner can research and compare various number systems, their relevance throughout history.</p>
<p><b><u>Angle, Symmetry and Transformation</u></b></p> <p>Consistently and accurately describe, follow and record routes and journeys using appropriate vocabulary including angles. The learner can recognise the importance of grid reference systems in the wider world and can apply their knowledge to locate and describe position. Learners can recognise symmetrical pictures, patterns and shapes.</p>	<p><b><u>Data and Analysis</u></b></p> <p>Accurately collect, sort and present information using simple labeling and scale in a variety of ways including technology. They can accurately interpret data and construct relevant questions.</p>	<p><b><u>Ideas of Chance and uncertainty</u></b></p> <p>Reflect on their experience and apply their knowledge to make informed predictions and justify the likelihood of events occurring, demonstrating the appropriate vocabulary of chance and uncertainty in a variety of situations.</p>	<p><b><u>Expressions and Equations</u></b></p> <p>Consistently apply appropriate vocabulary and symbols to demonstrate knowledge of number relationships where a number is replaced by a picture or symbol. Learners can successfully apply their knowledge of number facts and processes to find the value and explain their thinking.</p>	<p><b><u>Properties of 2D &amp; 3D objects</u></b></p> <p>Distinguish and explain the similarities and differences between 2D and 3D objects. A secure learner can demonstrate their understanding by applying their knowledge of relevant properties and features in various situations including creating tiling patterns.</p>
<p><b><u>Patterns and relationships</u></b></p> <p>Recognise, continue and create patterns using a variety of media and can explain the rules applied.</p>				

## Appendix 3 – Features of an achieving learner – Second Level

<p><b><u>Estimation and Rounding</u></b> Apply the skill of rounding in mental and practical calculations in order to estimate when solving a problem and, having reflected on their estimate, can justify their strategy to others.</p>	<p><b><u>Number and Number Processes</u></b> Calculate and solve problems using whole numbers, decimal fractions and negative numbers using a variety of methods in a range of contexts, sharing approaches and solutions with others. The learner can solve problems using a range of strategies and can apply appropriate operations.</p>	<p><b><u>Money</u></b> Have a realistic understanding of cost, work within a budget and determine best value in making choices: show awareness of the variety of cash and credit transactions available and identify their advantages and disadvantages: apply and use their knowledge about profit and loss in realistic situations.</p>	<p><b><u>Fractions, Decimal Fractions and Percentages</u></b> Work with and order fractions and their equivalents as decimal fractions and percentages. They can apply their knowledge and skills in various contexts to calculate fractions of quantities and simplify and create equivalent fractions</p>	<p><b><u>Time</u></b> Plan events and estimate duration of time-based activities, access various timetables and schedules used in every day life. Learners are able to demonstrate a clear understanding of the link between time, speed and distance and clearly demonstrate the ability to select the correct unit of time.</p>
<p><b><u>Multiples, Factors and Primes</u></b> Identify and explain patterns within time tables and can instantly recall multiplication facts; and demonstrate their knowledge of the relationship between multiplication and division as inverse processes. Using this knowledge they can, through a variety of activities including problem solving in context, identify multiples and factors of numbers.</p>	<p><b><u>Second Level - An achieving learner can</u></b></p> <ul style="list-style-type: none"> <li>• Demonstrate that they have achieved a breadth of learning across almost all of the experiences and outcomes for the level.</li> <li>• Respond consistently well to the level of challenge set out in the experiences and outcomes.</li> <li>• Move forward to more challenging learning in some aspects.</li> <li>• Apply what they have learnt in new and unfamiliar situations</li> </ul>			<p><b><u>Mathematics – Its impact on the world past present and future</u></b> Contribute to research and discussion on the role and relevance of mathematics to their world, including its importance to scientific advancement a technological development throughout history and into the future. The learner can present the knowledge acquired in a relevant format.</p>
<p><b><u>Measurement</u></b> Estimate length, height, weight, volume and area of familiar objects or places using standard units of measure and the related units and can carry out conversation between them and calculations using them. The learner is confident in the selection and use of appropriate measuring devices and can apply them for use in real life situations. Through practical activities the learner can demonstrate techniques for calculation perimeter and area of 2D shapes, volume and surface area of 3D objects.</p>	<p><b><u>Properties of a 2D shape and 3D Objects</u></b> Use a specific mathematical language to describe 3D objects and 2D shapes and recognise these in their environment; investigate and construct 3D objects using nets and explain the relationship between them. The learner can identify 2D shapes within 3D objects. They can apply this knowledge within specific challenges.</p>	<p><b><u>Angles, Symmetry and Transformation</u></b> Identify angles in the environment, measure and draw angles accurately and use with compass points for directions. They can apply scale to maps and models; read and plot co-ordinates on a grid in 2D shape, they can identify and draw lines of symmetry and continue</p>	<p><b><u>Data and Analysis</u></b> Interpret and analyse data, recognising that this may be presented in a misleading way. They can create an effective survey using a range of information gathering techniques, to collate, organise and communicate results in appropriate formats. Data is presented in a clear way using scales and formats, incorporating effective use of I.C.T.</p>	<p><b><u>Patterns and Relationships</u></b> Investigate, identify, continue and create increasingly complex well-known patterns. They should also be able to explain and apply the particular rule used.</p>
<p><b><u>Expressions and Equations</u></b> Draw upon skills and concepts previously learned to determine the value of a symbol or letter within a mathematical statement. The learner should be able to explain strategies used to solve equations and apply this knowledge to create their equations.</p>				<p><b><u>Ideas of Chance and Uncertainty</u></b> Record and discuss their predictions and findings in a systematic way, using appropriate vocabulary. They can devise and conduct various experiments to investigate chance and probability</p>

## Appendix 4 – Features of an achieving learner – Third Level

<p><b><u>Estimation and Rounding</u></b> Examine a problem and select an appropriate rounding strategy to accurately predict the solution.</p>	<p><b><u>Multiples, factors and primes</u></b> Apply an investigate method to find common multiples of two or more numbers; apply skills and knowledge in an unfamiliar and problem-solving context, and use an appropriate method to find common factors. They can show understanding of multiples and factors to find prime numbers, explaining why numbers are prime.</p>	<p><b><u>Number and number processes</u></b> Identify the steps and calculations when analysing a problem and select the appropriate operation including multiple operations. The learner can apply their knowledge accurately, extending it to negative numbers and justify their method and solutions.</p>	<p><b><u>Money</u></b> Research, analyse and critically evaluate a variety of contracts and services to determine the most financially advantageous to match personal needs and justify choices including technology, budget effectively to plan ahead.</p>	<p><b><u>Fractions, decimal fractions and percentages</u></b> Interchange between fractions, decimals and percentages. They can apply their knowledge to calculate fractions/percentages of quantity including real life contexts; demonstrate their ability to convert improper fractions to mixed numbers and vice-versa and add and subtract proper fractions. They can evaluate percentage/fractional increases/decreases in everyday contexts.</p>
<p><b><u>Powers and roots</u></b> Explore the use of notation and vocabulary to write positive numbers with whole number powers. They should be able to explore square numbers and square roots and can evaluate simple calculations involving powers and roots.</p>	<p><b><u>Third Level - An achieving learner can....</u></b></p>		<p><b><u>Time</u></b> Demonstrate their understanding of the relationship between distance, speed and time by selecting the appropriate formula in a variety of contexts. They can convert time from minutes to a decimal fraction of an hour. They can construct and interpret distance/time graphs accurately and can apply this knowledge to calculate and solve.</p>	
<p><b><u>Measurement</u></b> Use their knowledge of measure to solve contextual problems, including compound areas and volumes, through investigation and demonstration incorporating a variety of methods. Pupils are expected to choose appropriate degree of accuracy, suitable units and formulae.</p>	<ul style="list-style-type: none"> <li>• Demonstrate they have achieved a breadth of learning across almost all of the experiences and outcomes for the level</li> <li>• Respond consistently well to the level of challenge set out in the experiences and outcomes</li> <li>• Move forward to more challenging learning in some aspects</li> <li>• Applied what they have learnt in new and unfamiliar situations.</li> </ul>		<p><b><u>Mathematics – Its impact on the world past present and future</u></b> Work collaboratively to research and investigate a famous mathematician or topic and select and collate appropriate information to prepare and deliver a short presentation of their findings.</p>	<p><b><u>Patterns and relationships</u></b> Generate complex number sequences using given rules and can also create the rule for a given complex number sequence expressing this using appropriate mathematical notation.</p>
<p><b><u>Expressions and equations</u></b> Confidently and competently construct and solve equations using mathematical language to explain the process. They can create and evaluate simple formulae from a variety of contexts and information to include real life situations.</p>	<p><b><u>Properties of 2D shapes and 3D objects</u></b> Using prior knowledge of 2D shapes a secure learner can apply the properties to plan and construct accurate drawings of these shapes using a variety of methods and appropriate measuring instruments.</p>	<p><b><u>Angle, symmetry and transformation</u></b> Demonstrate an understanding of angles by being able to measure properties associated with intersecting and parallel lines and apply this knowledge to real life problems. They can apply their knowledge of bearings to interpret and create accurate maps, plans and routes. They can apply their understanding to enlarge or reduce scale drawings. They can plot and interpret points on appropriate co-ordinate system and use their knowledge of symmetry to create transformations. They can accurately produce detailed drawings of 2D shapes using a range of mathematical instruments.</p>	<p><b><u>Data and analysis</u></b> Work collaboratively using ICT to source, interpret and critically evaluate information presented in a variety of ways. When analysing and collecting information, they can use their understanding to how factors such as bias and sample size affect validity, ensuring conclusions drawn are fair.</p>	<p><b><u>Ideas of chance and uncertainty</u></b> Calculate the probability of an event happening expressing this as a fraction or percentage in its simplest form; use within problems to decide the likelihood of events, make predictions, make comparisons and justify choices.</p>

## **Appendix 5 - Significant aspects of learning**

### ***Number, money and measure Numeracy and Mathematics***

- understanding number, the number system and its operations, including within standard measures, money and time
- estimating and rounding
- calculating mentally
- understanding and using the concept of place value
- understanding and applying the concepts, notation, inter-relationships and operational skills of fractions, decimal fractions and percentages
- understanding and using inverse processes to simplify a problem
- recognising, working with, extending, and justifying patterns based upon attributes and numbers
- progression from specific numbers to generalised algebraic thinking.

### ***Shape, position and movement***

- classifying and relating 2D shapes and 3D objects using their key properties
- understanding and applying geometry skills relating to angle, symmetry and transformation.

### ***Information handling***

- interpreting statistical information in the world around us
- assessing risk and making informed decisions.

### ***Problem solving***

Learners will draw on these key aspects of learning from the three organisers as they solve a wide range of problems, originating from real life or from within mathematics learning or from scenarios encountered across the curriculum. As they do so they will demonstrate confidence in using appropriate mathematical language and notation, in applying key mathematical properties and relationships and in the use of mathematical thinking skills.

## Appendix 6 - Learner Conversations - Sample

### Approach to Learning Conversation with Pupils

#### Learner/Group:

#### Class:

- Discuss with pupil(s) some recent organiser they have been studying
- Go through the questions/conversation below
- Repeat with a second/organiser to ensure breadth of coverage e.g. choose one organiser from Maths and one from numeracy

#### Task

- Use the descriptor of an achieving learner to create question stems to support your learning conversation on 2<sup>nd</sup> level Money

#### Conversation

- Can you think of an example of some methods of payment I might use to buy a sofa for my house?
- Can you explain which of these payment methods would be best and why?
- When did you use a budget to plan purchases?
- Could you work out questions like ...? If I take out a loan for £1000 over 12 months which has an APR of 5%, how much will I have to pay back in total?
- How can you demonstrate that you understand the advantages and disadvantages of using credit cards?
- Can you show how you might budget for a birthday party if I gave you £40 to spend on arranging one?