



Hamp Nursery & Infants' School

Mathematical Understanding

**Policy
2020-2021**

The Nature of Mathematical Understanding

“Mathematical understanding” is a tool for everyday life. It is a whole network of concepts and relationships which provide a way of viewing and making sense of the world. It is used to analyse and communicate information and ideas and to tackle a range of practical tasks and real life problems. It also provides the materials and means for creating new imaginative worlds to explore.

Aims

Using the Curriculum for the Early Years Foundation Stage, the objectives from the National Curriculum 2014 and the small steps from White Rose scheme of learning, it is our aim to develop:

- a positive and confident attitude towards mathematical understanding;
- the acquisition of mathematical vocabulary;
- an ability to communicate mathematical understanding;
- an awareness of the fascination of mathematics;
- competence and confidence in mathematical knowledge, concepts and skills;
- a mastery approach to mathematics with an ability to solve problems, to reason, to think logically and to work systematically and accurately;
- initiative and an ability to work both independently and in cooperation with others;
- an ability to use and apply mathematical understanding across the curriculum and in real life;
- an understanding of mathematics through a process of enquiry and experiment.

Objectives

- To become successful learners;
- To discuss maths confidently using appropriate mathematical vocabulary;
- To develop knowledge, skills and understanding;
- To be able to adopt a mastery approach to mathematics, involving fluency, varied fluency and reasoning and problem solving skills;
- To count, read, write and order and compare numbers;

- To develop confidence in using a range of calculation methods;
- To be able to read, write and find fractions;
- To begin to use written methods for calculation and recording;
- To be able to collect data and draw inferences;
- To recognise, name and compare 2D and 3D shapes and know their properties;
- To understand and use various measurements, including mass/weight, volume/capacity, length/height, temperature, money and time;
- To be able to use positional and directional language;
- To use and apply learning in everyday real life situations.

Speaking and Listening

The role of language in the development of mathematical understanding is vital and therefore it is important to maximise speaking and listening opportunities in all mathematical experiences. Provision of time to talk and varied settings for both talking mathematically and talking about maths will enable children to make connections and strengthen their understanding. There is much specific mathematical vocabulary which children need to learn to use in the right context and opportunities for modelling this and providing opportunities to practise it need to be central to lesson planning. Giving children regular opportunities to reason and problem solve will encourage further development of specific mathematical language.

Implementation

Early Years Foundation Stage

Mathematical understanding for all children working at the EYFS is planned from the “Curriculum guidance for the Foundation Stage”. Their mathematical understanding will be developed through activities, stories, songs, games and imaginative play providing daily experiences in a rich and varied environment giving access to a variety of appropriate mathematical models and images. Teachers will plan, where appropriate, cross curricular activities taking into account their continuous and rigorous assessment, to ensure they are meeting the needs of the individual children. Where children achieve their Early Learning Goals + before the end of their Reception Year, their Learning Objectives will then be planned to include the mastery approach and broaden their understanding.

Key Stage One

We recognise that the transition from the Early Years into Key Stage One is a developmental stage which children will meet at different times in their school life. Rigorous and continuous assessment informs Teacher's planning and children are moved onto Key Stage One curriculum/timetable when it is deemed appropriate for them to do so. During this time, children may make more or less progress than expected and when PSED/CLL show that they are ready to learn in a more formal way, this may be discussed with the Numeracy Co-ordinator, SENCO or G&T co-ordinator in order to make suitable provision and provide appropriate support.

At Key Stage One Teachers use the objectives from the National Curriculum 2014 and the small steps from the White Rose scheme of learning at the appropriate level as shown by the child's Assessment records and tracking data. Planning can be discrete or cross curricular. Linking maths with other areas of the curriculum helps to make it interesting, relevant and accessible to pupils. Where Teachers deem the learning objective for mathematical understanding can best be met through links to other areas, they will plan opportunities to access maths through a variety of routes including the familiar environment, topic work, multi-cultural resources and computing.

Breadth of Study

Through a continuous program of assessment, careful planning and preparation we aim to ensure that throughout the school children are given opportunities for:

- talking about their thinking using relevant mathematical vocabulary;
- practical activities and mathematical games;
- experiencing varied fluency;
- reasoning and problem solving;
- being exposed to different question stems;
- mathematical speaking and listening activities;
- individual, group and whole class discussions and activities;
- open and closed tasks;
- a range of methods of calculating eg. concrete, pictorial, abstract, pencil and paper;

- working with computers as a mathematical tool.

Teacher's planning and organisation

Each class teacher is responsible for the mathematical understanding in their class in consultation with, and with guidance from the mathematics co-ordinator.

Lessons should be planned using the objectives from the National Curriculum 2014 and the small steps from the White Rose scheme of learning. The school calculation policy should be adhered to.

In order to maximise teaching time it is vital that specific resources required are included in lesson planning and that general mathematics resources are organised in such a way that all children are able to access the equipment they need **quickly** and **independently**.

The approach to the teaching of mathematics within the school is based on three key principles:

- a mathematics lesson at least 4 times per week, with other mathematical opportunities planned;
- a clear focus on direct, instructional teaching and interactive oral work with the whole class and group sessions;
- an emphasis on mental calculation and reasoning and problem solving built on practical understanding;

Teachers of the Early Years Foundation Stage classes base their teaching on objectives in the Framework for the Early Years. This ensures that they are working towards the 'Early Learning Goals for Mathematical Development'. Towards the end of the Foundation Stage Teachers aim to draw the elements of a daily mathematics lesson together so that by the time children move onto the Key Stage One curriculum they are familiar with the 45-minute lesson. However, for organisational and teaching purposes during the Early Years children's mathematics lessons should not be whole class.

Each Key Stage One class organises at least four lessons per week of approximately 40/45 minutes for mathematical understanding. Lessons should not be whole class for the majority of the time.

Lessons should contain the three strands of the Mastery approach. Depending on ability, these strands may be evident in every lesson or less frequently. However, all children should have regular opportunities to explore each strand:

- fluency;
- varied fluency;
- reasoning & problem solving;

These strands should not be stand alone and should be carefully integrated into lessons and evident in all planning.

Lessons should also:

- provide daily oral and mental work to develop and secure calculation strategies and rapid recall skills;
- devote a high proportion of lesson time to direct teaching to introduce, demonstrate, practise and consolidate new skills and concepts.

Teachers will also ensure:

- access to a range of appropriate and motivational resources;
- opportunities for children to explore their ideas through discussion and questioning;
- differentiation within each lesson, either through learning objective, vocabulary, Teacher or TA support, expectation or outcome. This should be clearly shown in the Teacher's planning and based on up to date and relevant assessment;
- variety in the lessons to maintain children's interest and curiosity.

Lessons are planned in Key Stage One using common planning formats, and are monitored by the mathematics coordinator. Planning is monitored by the Head Teacher and Deputy Head Teacher on a half termly basis.

Books are scrutinised by the Senior Leadership Team termly.

Teachers will carry out planning for Mathematical understanding in three phases:

Long Term planning will be carried out using the objectives from the National Curriculum 2014 and the small steps from the White Rose scheme of learning and Curriculum Guidance for the Early Years Foundation Stage. All planning is informed by rigorous and continuous assessment and therefore long term planning may be from a different term or year group. This will clearly be shown in planning and backed up by Assessment.

Medium Term planning will be carried out on a half termly basis. This is done on a "medium term planning grid" and should be available at the beginning of each half term, showing intended learning opportunities. All numeracy MTPs must be put onto the public drive in the relevant folder and a hard copy given to the Numeracy Co-ordinator by the end of the first week of every term. Plans should show general learning objectives eg "name 3d shape" or "counting to 20", as assessment often necessitates change and details of organisation or differentiation will then be included in the short term planning. Medium term planning should also show links to other curriculum areas, particularly speaking and listening, to ensure children are given every opportunity to make connections across all aspects of their learning. Hard copies of planning should be annotated with any changes.

Short Term planning will show learning opportunities and activities for each part of the lesson. In Key Stage One this is in the form of a weekly timetable, showing mental starter, learning objective, main activity, vocabulary, assessment and plenary. This will include how pupils will be grouped, which groups will be supported by the Teacher or TA's, differentiation for the class, and any further support required. Assessment of Teaching and learning in that lesson should also be shown using a "Traffic lights system". Where this form of planning may not be appropriate in the Foundation and Nursery classes, planning formats are used to best suit the needs of the children, and may be in the form of daily planning.

Differentiation

This should be incorporated into all mathematics lessons and can be done in various ways:

- Stepped Activities which become more difficult and demanding but cater for the less able in the early sections;
- Common Tasks which are open ended activities/investigations where differentiation is by outcome;
- Resourcing which provides a variety of resources depending on abilities eg. counters, cubes, 100 squares, number lines, mirrors;
- Grouping according to ability so that the groups can be given different tasks when appropriate. Activities are based on the same theme and usually at no more than three levels.
- Support according to ability, groups may work independently, with support as necessary, with support or as a guided group. All groups should have the opportunity to be supported in a variety of different ways and all groups should have the opportunity to work independently. All adults should be fluid and work with different groups across the ability ranges.

Special Educational Needs

It is our aim to fully include all of our children within the daily mathematical lesson. Planning from the appropriate level based on continuous and rigorous assessment, differentiation and Teacher and TA support provides the opportunity, wherever possible for all children to fully access the daily Maths lesson. Where children's needs are best met with 1:1 support, provision should be timely and carried out in the classroom.

Where applicable children who have been identified as having an individual or specific need may have an IEP or Pupil Passport, which will incorporate suitable objectives from Curriculum Guidance for the Foundation Stage or the NNS Framework and teachers will plan to include these objectives in the planning for the class.

In addition to providing activities to support children who find mathematical understanding difficult, Teachers also make provision for those who are Gifted and Talented in Maths. Differentiation is clearly shown in planning.

Teaching Assistants will also support Teaching and Learning in Mathematical understanding lessons. The Teacher and TAs plan together daily to ensure a shared expectation and understanding of the Learning Objectives and expectations. The Teacher or TA may work with SEN or G&T children, either supporting a group or individual children. Assessment and Feedback is then recorded as appropriate, either on sticky notes, onto timetables or in Assessment books.

Equal opportunities

Every effort will be made to ensure all children have equal access to the full range of the curriculum.

The needs of Ethnic Minority children or children with English as an additional language are taken into account when planning and preparing resources. We incorporate mathematical understanding into a wide range of cross-curricular subjects and seek to take advantage of multi-cultural aspects of mathematics.

Boys' and girls' learning is closely monitored by the class teacher and the Numeracy co-ordinator. Assessment and tracking data is scrutinised and findings are then used to inform Planning. This may influence teaching styles, types of resources used, variety in learning environments and expectation.

Additional support is given if necessary to ensure equal opportunities for all children. This may be individual or group support, pre-teaching of vocabulary, application of skill by playing a game, reinforcement of instruction or questioning. STC is used throughout the Nursery and School to support Teaching and Learning.

Pupils' records of their work

We recognise that a great deal of Mathematical understanding is taught in practical lessons. Children would not be expected to produce "recordings" for all learning. Records may be kept through photographs, assessment or notes by practitioners.

There are occasions when it best suits the Learning Objective to use an activity/work sheet. These are one tool and may be used as part of a well-balanced and varied provision but should be a minimal part of the diet for learning. Any sheets should be immediately glued into the child's workbook to provide a continuous and progressive record of their learning.

As soon as it becomes appropriate children are taught to carry out written calculations. It is also important to record aspects of mathematical investigations. Children are taught a variety of methods for recording their work and they are encouraged and helped to use the most appropriate and convenient method of recording.

Exercise Books for Recording

It is school policy that the following pattern is used:

- | | |
|--------------------------------|--|
| • Early Years Foundation Stage | one plain book for all work (The class book) |
| • Transition into Year 1 | as EYFS |
| • Year 1 (when ready) | 1cm squares |
| • Year 2 (when ready) | 7mm squares |

Children continuing to work at the EYFS will continue to use their class book for all work regardless of which year group they are in.

All children are encouraged to work tidily and neatly when recording their work. When using squares one square should be used for each digit. However, when writing words, children should write with the normal finger spaces and not one letter per square. Children are

encouraged to use space and work on from the previous lesson and not to start a new page until necessary.

Marking

Marking in Mathematics should be both diagnostic and summative and school policy believes that it is best done through conversation with the child. However, work in mathematics can generate a great deal of marking and it is recognised that it is not always possible to annotate and comment on every piece of work, due to time constraints, where children have met the learning objectives, (green dot). Where children have not met the learning objectives (orange or red dots), work MUST be annotated.

More important is the quality rather than the quantity of any marking. A simple 'X' is of little assistance to a child unless accompanied by an indication of where the error occurred, together with an explanation of what went wrong. Verbal feedback should be annotated on the child's work.

It is our policy to mark children's work, as much as possible with the child as they complete it, in order to provide immediate feedback, discussion and time for correction. Work should not be marked in red pen and should be positive and focus on how to correct mistakes and improve. Mistakes should be dotted, rather than marked with a cross. Once the child is familiar with self-editing, they should then be given the opportunity to correct their mistake using green pen, unless they spot the mistake themselves and then purple pen should be used.

Once a week, work should be deep marked with a green comment which is positive and related to the WALT and a purple comment. When children are able to answer the purple comment, it should alternate between a comment and a question to deepen their understanding. For children who are not ready to answer their purple comment, it should be a next step.

Where work is recorded in the "Let's share what I did at school this week" – blue home books, it should all be assessed and levelled as appropriate, from the Early Years Foundation Stage.

Assessment and record keeping

At Hamp Nursery and Infants' school we recognise that assessment is an integral part of the planning process. Class teachers and teaching assistants will assess children's knowledge, skills and understanding in three ways:

- Short term assessments;
- Medium term assessments;
- Long term assessments.

Short term assessments are an informal part of every lesson, closely related to the learning objective and are crucial to inform daily planning. These may be recorded in the form of notes, either post-its, an "Assessment book" or dedicated space on weekly timetables. Assessment may then lead to adjustments in planning. Key Stage One classes also use the "Traffic lights

system” on their Numeracy weekly timetable, highlighting in Green, Yellow or Red to provide a clear and quick visual reference system. Where beneficial tick charts for record keeping purposes may also be used.

Medium term assessments are used to measure progress against key objectives and to inform planning for the next unit of work.

In the Early Years Foundation Stage classes, records are kept in the form of “Pathways” booklets and these are used on an “evidence” basis, with practitioners updating them as children show particular progress in their knowledge, skills or understanding, related either to their learning objective or to the child’s “self initiated play”, and are used to inform future planning.

In Key Stage One, individual assessment sheets for each area of mathematics are dotted and dated to record progress. These are related to the key objectives and are used as an ongoing record. Each statement must have at least three dots before it can be achieved and crossed off. These dots and dates must refer only to work that was done independently and this should be evident in the books and on the WALTs.

Each year group uses a system of colour-coding, using a different colour for each term to provide a quick and clear visual reference of the progression made across the child’s learning journey.

Individual assessments of mathematical understanding are then transferred to a class tracking grid and targets are set for Key Stage One pupils. These are reviewed by the Numeracy subject leader and discussed with the Head Teacher and Deputy Head Teacher at the termly pupil progress meeting. Then interventions and support can be put into place where necessary.

Long term assessments are made towards the end of the school year to finalise progress and standard achieved and to provide information for class structure and support required for the following year. Year Two pupils will complete the statutory Key Stage One mathematics tasks and tests. Teachers will complete the Teacher Assessment for each child.

Termly Evaluation

As part of the process of assessment the evaluation of termly plans is vital. This shows what has been taught, what was successful or not and what has yet to be learned. It gives a clear indication of the standard reached and where to go next, specific in Key Stage One to term and year from the National Curriculum and the White Rose small steps. This serves as a class record of progress. The teacher may wish to make notes on individual children whose progress differs markedly from the rest of the class, and the reasons for it. These notes and class record are reviewed by the Numeracy subject leader and discussed with the Head Teacher and Deputy Head Teacher at the termly pupil progress meeting. These should be passed to the child’s next teacher at the end of the school year.

Reporting to Parents

Parents are informed of their child’s progress in a number of ways.

On a termly basis, using a “Let’s share what I did at school this week” book, where a range of evidence across the curriculum is included for a week in each of the six terms. This may be recorded work, photographs of practical activities or comments by practitioners. All evidence is annotated including standards and next steps as appropriate. Key Stage One children include self-assessment with the use of a “speech bubble” commenting on what they feel they have learnt in that week.

Two Parents days are available in the Autumn and Spring Terms, for parents to attend with their child to discuss their progress, and also to provide an opportunity for children to share their achievements by showing their parents around their classroom and school. A third opportunity is also provided following the written report in the Summer Term.

Individual Reports are completed before the end of the summer term. For the Early Years Foundation Stage this includes the “Pathways” booklet with the six areas of learning, and for Key Stage One each area of the curriculum. Comments for Mathematical understanding should focus on the child’s achievement and attainment and make suggestions for their next steps in their learning journey.

Teachers use the information gathered from their termly assessments to help them comment on individual children’s progress.

Records of achievement/portfolios

During Summer B term, children will complete three pieces of work; one in each of the following areas: Number, Shape, space or measure and investigation. These form part of the children’s “individual portfolios” which are passed onto the next class teacher or to the KS2 placement, and will therefore show progress and achievement for the child’s learning journey so far.

A portfolio of work (under review 2020) is also kept by the Numeracy subject leader. It includes some mathematics samples of work, as evidence of the standards to which children are working in the school. These samples are updated and discussed every two years. We also compare work to the annotated examples in the “The NCA exemplifications of key learning objectives from Reception to Year 6” which sets out for each key objective, annotated examples of what pupils in each year should be able to do. This process is shared across Early Years, Key Stage One and appropriate Key Stage Two colleagues

Parental Involvement

- Parents are invited into school twice yearly to look at their children’s work;
- “Let’s share what I did at school this week” booklets sent home half termly;
- When significant changes have been/are made to the mathematical understanding curriculum parents are invited to a meeting or sent information via newsletters.

The role of the “Mathematical understanding” co-ordinator

Monitoring, mentoring and evaluating

Monitoring of the standards of the children's work and the quality of the teaching throughout the school is the responsibility of the numeracy co-ordinator who reports to the Deputy and Head Teacher. This is a process of evaluation and should be supportive and aim to raise standards by improving the quality of Teaching and Learning. This will be through lessons observations and book scrutiny.

The role of the co-ordinator also involves supporting colleagues in the planning, assessment and teaching of mathematics, being informed about current developments in the subject and providing a strategic lead and direction for the school.

The Head Teacher, Deputy Head Teacher and the Numeracy Co-ordinator discuss the strengths and the weaknesses of the subject reporting to the SLT and Governing body and indicating any areas for further improvement.

Resources

Each class has a supply of basic equipment needed for the day to day lessons. Teachers should organise an area within the classroom dedicated to resources for Mathematics. This area should be easily accessible to all children and allow them to become familiar with the resources, learning to handle them independently and to make choices to support their own learning.

Resources which are not used as regularly or are shared by all are clearly labelled and stored centrally in the Resources Room. A list of resources is available from the subject leader.

Homework

It is our school policy to provide parents and carers with opportunities to work with their children at home. These activities may only be brief, but are valuable in promoting children's learning in mathematical understanding.

Activities are sent home on a regular basis and for mathematics may take the form of number games or tasks, with children progressing onto more formal exercises in Key Stage One when they are ready. Homework should consolidate or support the current learning objective, with clear instructions, including mathematical vocabulary as appropriate.

In Key Stage One, for children who are on track to meet the expected standard or above, homework should be set once a week. It should go out and be returned on the same day each week to avoid confusion.

The homework policy should be adhered to

Review

This policy will be reviewed annually by the Numeracy subject leader following an informative process of lesson observation, pupil progress meetings, subject leader updates and evaluation. Any amendments will be approved by the SLT and presented to the whole staff

before implementation.

Next review date: September 2020

This policy was adopted on _____

By _____

Signed _____

Print Name _____

Position Held _____