**Processes in Mathematics**

**Using Mathematics**
- Select, with help from the teacher, materials and equipment for a task, eg \(\text{factor!}\) containers should we use to fill the bottle?\(^4\).\(^5\).\(^6\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ldots\)\(\ld::

**Communicating Mathematically**

- Use informal language to respond to questions and to talk about their work, eg "I put this shape there because it looks the same as the others but it's bigger".
- Understand and use mathematical language, eg bigger, altogether, more, forwards, when talking about their work.
- Explore, through discussion, simple open-ended questions, eg "How can we find out?"; "What should we do first?"; "What could we try next?"; "What materials could we use?"; "How could we check these materials?";
- Talk about and record in own way, how a simple investigation was carried out, eg finding different ways of making 6.

**Mathematical Reasoning**

- Begin to explain their thinking, eg: • how a task was approached (a problem was solved);
- simple patterns or relationships;
- the reason(s) for making a simple prediction;
- personal calculation strategies (eg to add 5 and 6, you add 5 and 1 to make 2);
- how an estimate of a simple calculation or measurement was made;
- Review own ways of working (with teachers/pupils), eg the steps taken, any patterns found or predictions made; that information and/or findings are presented in an organised way.
- Consider alternative ways of working (with teachers/pupils), eg different ways to solve problems (eg adding 29 and 17 by rounding and adjusting, identifying a pattern), a more efficient way of working: ways to overcome difficulties.
- Check accuracy of own work (with teachers/pupils), eg that entries have not been entered twice, that all information has been recorded, using addition and subtraction as inverse operations, the reasonableness of their outcomes.
- Explain their thinking, eg the reasons for choices made in selecting materials and mathematics to use; how a task was approached (a problem was solved); the reasons for choosing a simple prediction; personal calculation strategies (eg to find 18-6 you take away 10 to make 12 and then take away 5; how an estimate of a simple calculation or measurement was made; simple patterns and relationships.
- Compare own methods/findings/presentation with that of others.

Select and use materials and equipment for a task, eg choose a trundle wheel to measure the perimeter of the playground.
- Choose and use appropriate numbers and ways of calculating in a wide range of contexts, eg calculate the sum of two 2-digit numbers mentally by partitioning.
- Suggest the information needed to carry out a task, how to obtain the information and ways to record it eg, when carrying out a survey of vehicles passing the school.
- Begin to organise own work and work systematically, eg when finding out who can jump furthest.
- Solve simple two-step problems set in real life contexts, eg "How many packets of sweets costing 24p can we buy for £2 and how much change would we have?"
- Begin to suggest how to present findings, eg using a list; table; drawing; diagram; bar chart; pictogram.

- Select and use materials and equipment required for their work, eg computer database or graphical package; scales; stopwatch.
- Identify and collect information required for a task, initially with teacher support.
- Suggest ways a task might be approached, eg by simplifying the task; looking for a pattern; making a list.
- Plan own work and work systematically.
- Suggest how to present findings, eg using a data collection sheet; sketches/diagrams/charts; organisational lists; tables (including frequency tables); prose.

- Discuss and respond to open-ended questions, eg "What information do we need to carry out the task?"; "How can we obtain the information?"; "How can we record the information?"; "What shapes can you make using 2 identical triangles?".
- Use a writing frame to plan what is needed to start solving the problem.
- Present findings in an appropriate way, eg using a writing frame, making a list; drawing a table, diagram or sketch; completing a bar chart.
- Talk about how they carried out a task, eg "We used a trundle wheel to measure each side of the playground, counting the clicks and writing down each length. We added the lengths together to find the distance round the outside."

- Discuss and respond to open-ended questions, eg "What information do we need to carry out the task?"; "How can we obtain the information?"; "How can we record the information?"; "What shapes can you make using 2 identical triangles?".
- Discuss and compare ideas and methods with others.
- Where appropriate, select or design a writing frame to plan work.
- Choose a format to record work and give reasons for the choice.
- Present findings using prose, numbers and symbols, to show how the problem was solved/investigation was carried out.
- Use appropriate language to describe orally their work, eg the mathematics used; the findings and how they are presented.

- Use the language of mathematics to express mathematical ideas precisely, eg predicting which shapes will roll and which will slide; predicting what will happen when 2 objects are put on the balance scales.
- Select and use effectively, materials and equipment required for their work, eg squared paper; angle measurer; stopwatch.
- Decide what information is required for a task and how to obtain it.
- Decide whether the information gathered is appropriate and sufficient for the task.
- Select and use appropriate methods and strategies, eg breaking the task into small steps; working backwards; using trial and improvement methods.
- Plan and organise work in a systematic and efficient way.
- Decide how to present findings, eg using symbols (\(\approx\), \(<\), \(\approx\)), line graphs; pie charts; frequency tables (grouped data).
- Recognise and apply mathematics in contexts across the curriculum, eg show science results using a line graph.