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## SECTION 5: INFORMATION COMMUNICATION TECHNOLOGY AND MATHEMATICS

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ICT is a valuable resource which should be used appropriately to help develop learners' knowledge and understanding in their study of Mathematics. It is important, however, to consider where ICT may add value to the learning over other non-ICT resources.

### Planning

As with all planning, start with the objectives.

ICT should enhance good Mathematics teaching. It should be used in lessons only if it supports good practice in teaching Mathematics. The whole range of ICT can be used in various ways to meet two important goals in the teaching of Mathematics:

- To support your teaching
- To motivate learners' learning

Before making any decision about using ICT in a lesson or a series of lessons, some questions need to be addressed:

- Is it directly related to the teaching and learning objectives for that lesson?
- Can the teacher and/or the learners achieve something more effectively with it than without it? Look at the skills/knowledge required by a learning objective and think what activity would best deliver the objective. Does using ICT add any value to the outcome of this activity?
- Beware of creative software instead of creative learners. Does the ICT being used enhance and encourage creativity in learners?
- How does the ICT being used allow all learning styles to access it?
- Is it suitable for whole class, small group or individual work?
- Does it allow learners to discuss their learning?
- Is it only addressing passive learning?
- Does it allow for active learning? Are the learners in control?

Teachers should be able to choose and use the most suitable and most effective resources, including ICT, to meet their teaching objectives.

The right ICT resources can help teaching and learning Mathematics in several ways including:

- Exploring, describing and explaining number patterns
- Practising and consolidating number skills
- Exploring patterns in data
- Estimating and comparing measures of distance, angle, time
- Experimenting with properties of shapes and geometric patterns
- Developing mathematical vocabulary, logical thinking and problem solving skills

Depending on the learning objectives and the grouping of the class, different ICT resources can be used more effectively than others. Some are more suitable for whole class teaching, whilst others can be used with small groups.

For instance:

A digital camera can be used by learners of all ages and abilities to take pictures to show examples of pattern or shape in the environment. This could be useful when devising a Mathematics trail round the classroom, school or outside area. Back in school, these pictures can be looked at in more detail in close-up using a graphics package.

A floor robot can be used by learners of all ages and abilities. The teacher can work with groups of learners, setting them a challenge of working on a series of instructions to move the robot along a straight path or around a course. Learners can then change and modify the instructions as necessary. Some learners may be asked to record the instructions for other groups to use.

Calculators can be very basic for younger learners or more complex for older learners. They can be used for early number and pattern work through to a teacher working with the class to support the teaching of decimals and fractions.

An interactive whiteboard allows the whole class to be part of the activity. For instance, a teacher may want to discuss and demonstrate the pattern of the numbers containing the digit 5 using first a 1–100 grid, then a 101–200 grid.

Using a computer programme a teacher can provide electronic images to help learners develop their understanding of place value or of square or triangular numbers.

An audio cassette tape can be used with the whole class or a smaller group to reinforce work done on times tables. This pre-taped audio cassette tape of a 'times-table rap' can then be used for them to listen to, using headphones plugged into a tape recorder.

Television broadcasts allow the whole class to watch a Mathematics programme on specific areas.

The internet can be used by groups of learners in order to log on to the Teletext website for up-to-date weather information. They can then record the average, maximum and minimum daily temperatures and the weather forecasts for their home city or a holiday destination and compare the two sets of data.

A video camera can be set up to record data of birds visiting a bird table over a period of time. The teacher then plays back the video and the learners use tally sheets, and then a block graph, to represent the data gathered. A video camera can also be used by learners as a way of communicating their learning during a presentation at the end of a lesson.

Sensors connected to a computer can measure changes in ambient light and temperature over 12 hours. After that time, the teacher can ask the learners to look at the data in graph form and suggest explanations for any changes, encouraging them to look for and explain connections between the changes in the different sets of data.

Flash movie is more suitable to group work where the teacher works with a group of up to six learners at the computer using the 'Sorting 2D Shapes' Flash program to discuss properties of shape. The learners use the computer to help them sort shapes.

An OHP calculator can be used with the whole class and can be used to support the teaching and learning of basic number pattern work through to decimals and fractions, for example.

An audio cassette recorder can be used with the whole class for listening to number songs and rhymes.

### Opportunities for ICT in the Cambridge Primary Mathematics Framework

Appendix D of this guide lists ICT opportunities and suggestions for use within Mathematics.