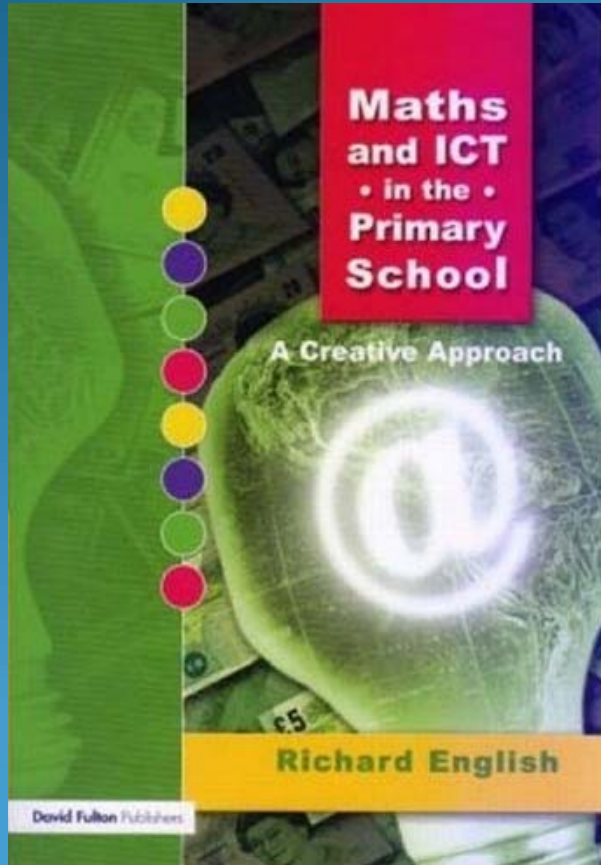# Use ICT Creatively in Primary Mathematics

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Observations over the last 30 years

There can be no doubt that the increasing availability of microcomputers in schools offers considerable opportunity to teachers of mathematics both to enhance their existing practice and also to work in ways which have not hitherto been possible.

The Cockcroft Report (DES, 1982)

Observations over the last 30 years

The potential of ICT to enhance learning in mathematics continues to be underdeveloped. The principal uses of ICT in the lessons observed were for presentation of material by teachers in whole-class teaching and by pupils for revision, practice and homework.

Mathematics Made to Measure (Ofsted, 2012)

School v Real World

- Technology at school v technology in the real world

- Mathematics at school v mathematics in the real world

Conrad Wolfram: Teaching kids real math with computers

http://www.ted.com/talks/conrad_wolfram_teaching_kids_real_math_with_computers.html

Why are teachers not utilising ICT effectively?

- Lack of subject and pedagogical knowledge

- Lack of confidence to use technology

- Lack of awareness of what is possible

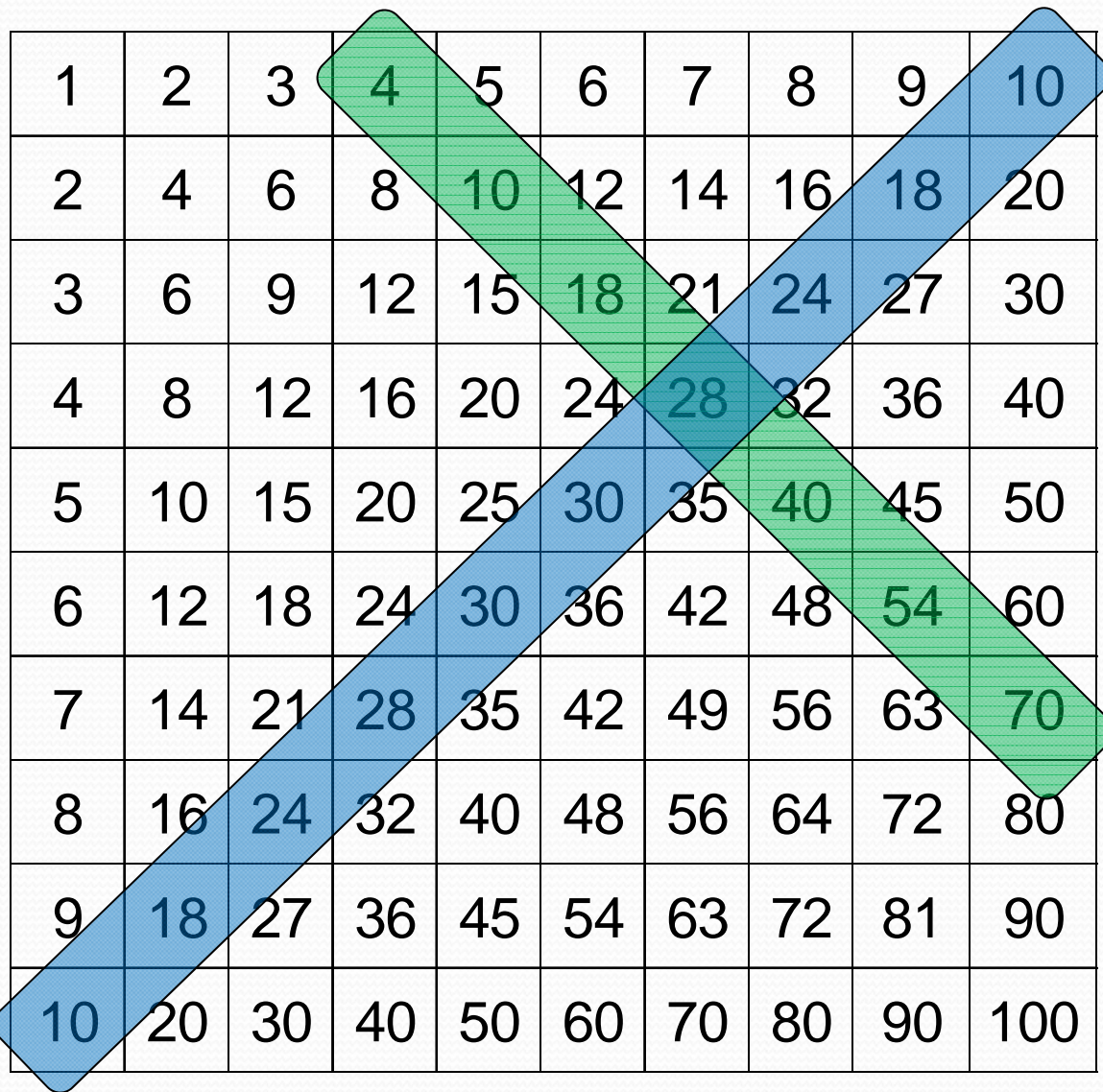- Curriculum constraints and assessment pressures

How can teachers be creative and effective in their use of ICT?

- Think 'outside the box'

- Start off by keeping things simple

- Do the simple things well

Counting Machine

Download from: http://www.numeracysoftware.com

- Simple software that has been available for many years

- Minimal mathematical content

- Big potential for children to use and apply mathematical skills e.g. Investigate number sequences, identify patterns, make predictions and general statements

1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100

Work out the *Counting Machine* parameters to generate these number sequences.

MSW LOGO

- Free download from http://www.softronix.com

- Children can program for themselves

- Teachers can create sets of procedures for children to use

- Again, these can focus on the use and application of mathematics

Number Clocks
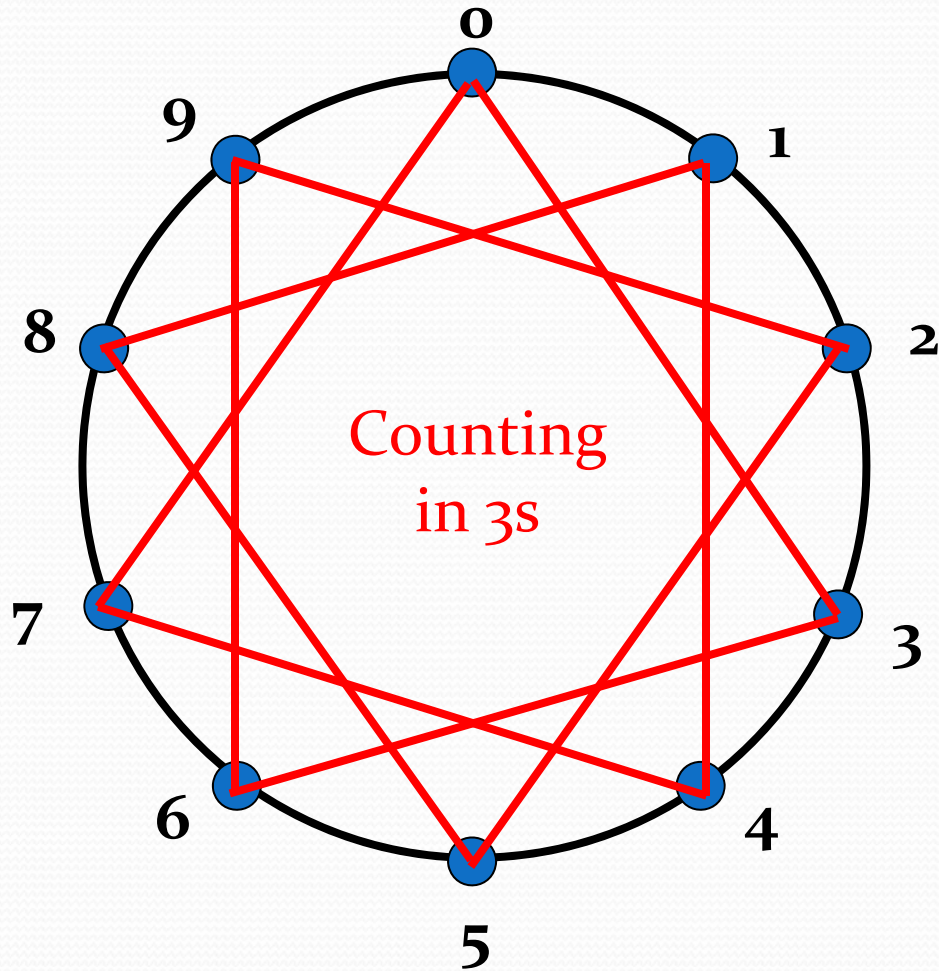
Number Clocks (initially without ICT)

- Try counting in other amounts – any numbers you want!

- How many different patterns or shapes are generated?

- Which counting numbers generate the same patterns or shapes?

Number Clocks (now with ICT)

- What if we don't use a 10-number clock?
  e.g. A clock with 12 numbers

- Try CLOCK 12 5

- Try CLOCK 12 7

- What shapes will these instructions produce?
  CLOCK 12 4   CLOCK 12 3

- Can these shapes be produced using other numbers?

- Find number combinations to produce
  - a regular hexagon
  - a regular octagon

Key Messages for Teachers

- It's all about children's learning – not the technology itself

- Technology doesn't always provide the best approach

- High-quality interaction between the teacher and the children, and between the children themselves is the key

- Technology should not be viewed as a 'bolt-on' – it should be integrated into the mathematics curriculum

- When used effectively, technology allows children to develop high-level skills such as experimenting, discovering, reflecting, hypothesis-making, predicting, generalising, testing, ...

Key Messages for Policy Makers

- Technology must feature in statutory curriculum requirements

- Comprehensive non-statutory guidance should be provided for teachers

- National testing requirements must recognise the technological advances that have been made in recent years

Thank you for listening (and joining in!)

To Discuss over Dinner

- I drink half of a bottle of port. Then someone else drinks half of what's left in the bottle. Then someone else drinks half of what's left, then someone else drinks half of what's left, ……
- How much of the port will we drink by the end of the evening?
- **How could you model this on a spreadsheet?**
- What if I drink a third of a bottle, and each person drinks one-third of what's left each time?
- What if I drink a quarter of a bottle, and ……

END OF PRESENTATION