

ICT: Using resources effectively

'How do I get them to stop playing and start thinking?'

Activity 1**Report and reflect on the lesson****15 minutes**


Take it in turns to share stories of what happened in your lesson. Give factual, descriptive accounts and show examples of pupils' work.

- Which problems did pupils choose to explore?
- What difficulties did they have with the mathematics?
- What difficulties did they have with the computers?
- How did you encourage pupils to move away from trial and error approaches?
- What records did pupils keep of their work?
- What did pupils learn about mathematics?
- What did pupils learn about the use of computers?

Activity 2**Explore the use of ICT as a thinking tool****10 minutes**


In the lesson, you used ICT to present a 'microworld' for pupils to explore. In this activity, you will look at a different use for the computer: as a generic *tool* for tackling a financial problem. You should make sure that the software is loaded onto the computer beforehand.



Work on the problem *Making and selling a magazine* ( [Handout 4](#)), using the spreadsheet template provided.

- Would you choose to use a spreadsheet to tackle this type of problem?
- How is the computer helping you to think mathematically?
- What mathematical processes and skills do you need?
- What computer skills do you need?

Now suppose that you gave this same problem to your pupils:

- What tools might they choose to use? (E.g. Graph paper, graphics calculator, spreadsheet?)
- Do you think they would be able to construct an appropriate spreadsheet from scratch? If not, what support would you need to give them? Would the hint sheet on  [Handout 5](#) help?
- Do your pupils do problems like this in ICT lessons? Do they transfer this knowledge? Why or why not?

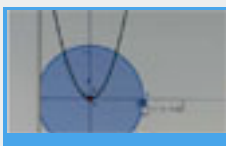
Activity 3**Observe a teacher using Magazine Sales****15 minutes**

Watch Peter's lesson on the *Magazine sales* problem.

- How does Peter help pupils to engage with the problem?
- Why does he ask pupils to tackle the problem on paper first?
- What are pupils learning about the mathematics?
- What are they learning about spreadsheets?

Activity 4**Relate ICT to the new programme of study for Mathematics****10 minutes**

The lessons you have seen represent two different uses of the computer in mathematics lessons. The new curricular emphasis on unstructured problems, where success depends on selecting the appropriate mathematical tools, suggests that teachers may need to change the balance of ways in which they use ICT. The following discussion outlines some of the issues involved.



The programmes of study for maths emphasise the need for pupils to learn how to represent, analyse and solve unstructured problems with ICT. Discuss how you can use ICT to develop the Key Processes as shown on [Handout 6](#).

Representing

- Can you give examples to show how ICT can be used to help pupils represent problems mathematically?

Analysing

- How can ICT encourage mathematical analysis and reasoning?

Interpreting and evaluating

- How can you encourage pupils to interpret results and form hypotheses?

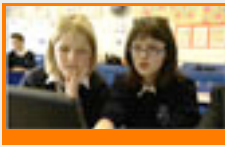
Communicating and reflecting

- How can ICT be used to help pupils communicate their thinking to others?

The pieces of software shown in this video segment were selected rather arbitrarily for illustrative purposes. However, they should all be freely available to schools. They are, in order of appearance:

- Traffic:** From *Improving learning in mathematics*
- Geogebra:** A free graphing and geometry package – see <http://www.geogebra.org>
- Algebra arrows:** From the Freudenthal Institute – see <http://www.fi.uu.nl/wisweb/en/>
- Dice races:** There are many implementations of this idea – this one is also from *Improving learning in Mathematics*

(For details on *Improving learning in mathematics* search for it on www.ncetm.org.uk)

Activity 5**Look at the use of ICT in the Case Studies****10 minutes**

Nearly all of the Bowland Case Studies make *some* use of ICT – several depend on fairly sophisticated software, others just include video clips for use on an interactive whiteboard or data projector.

Look at ***Portraits of the case studies*** . Pick one you might like to try and which makes significant use of ICT. Discuss:

- Why do you think the designers chose to use ICT for this activity?
- How is the ICT used? What role does it play?
- Do you see any practical problems that might prevent you using the case study? What might you do to overcome them?

Portraits of the case studies - available from the *Bowland Maths – an introduction* section of the DVD/Website - gives thumbnail sketches of each case study and the mathematics involved, analysed against the KS3 Programmes of Study.

The case studies featured in this video segment – which were selected quite arbitrarily – are, in order of appearance:

- Crash test
- PointZero
- Mystery tours
- Outbreak
- Reducing road accidents

Activity 6**Consider using other resources to provoke thinking****10 minutes**

Work on rich, less structured mathematical tasks should be supported by a selection of resources freely available to pupils. Depending on the problem, these can include:

- Clipboards and pencils
- Rulers, compasses, stop watches and other “handhelds”
- Counters and cubes
- Large paper for making posters
- Calculators (regular and graphical)
- Computers, scanners, printers and various software tools, where practicable...



- Which resources do you have in your classroom?
- Who decides when they are used?

Resources directly influence the ways in which pupils think about problems.

- Can you give examples from your classroom where the resources have helped or hindered learning?

Further reading

See  [Handout 8](#) for a list of references.