

## Worksheet Activity: More on Binary Numbers

1. Another interesting property of binary numbers is what happens when a zero is put on the right hand side of the number. If we are working in base 10 (decimal), when you put a zero on the right hand side of the number, it is multiplied by 10. For example, 9 becomes 90, 30 becomes 300.

But what happens when you put a 0 on the right of a binary number? Try this:

$$\begin{array}{ccc} 1001 & \rightarrow & 10010 \\ (9) & & (?) \end{array}$$

Make up some others to test your hypothesis. What is the rule? Why do you think this happens?

2. Each of the cards we have used so far represents a 'bit' on the computer ('bit' is short for 'binary digit'). So our alphabet code we have used so far can be represented using just five cards, or 'bits'. However a computer has to know whether letters are capitals or not, and also recognise digits, punctuation and special symbols such as \$ or ~.

Go and look at a keyboard and work out how many characters a computer has to represent. So how many bits does a computer need to store all the characters?

Most computers today use a representation called ASCII (**A**merican **S**tandard **C**ode for **I**nformation **I**nterchange), which is based on using this number of bits per character, but some non-English speaking countries have to use longer codes.

