

<p>Codes and Ciphers</p>	<p>UNIT 9 Code 3 of 9 Lesson Plan 1</p>																									
<p>Activity</p> <p>1</p>	<p>Introduction and discussion</p> <p>T: You have met two types of bar codes so far – can you remember what they are? (<i>EAN Bar Codes and ITF Symbols</i>)</p> <p>Can you think of one thing that neither of these types of codes can do? (<i>Code letters</i>)</p> <p>T: What is needed to code both letters and numbers? (<i>A more complicated code!</i>)</p> <p>T: Yes. One of the most used codes, found on, for example, many library tickets, security passes, hospital name tags is the Code 3 of 9.</p> <p>T: Although it looks complicated, it is straightforward to understand. Each message starts and finishes with * and each code has</p> <p style="padding-left: 40px;">5 BARS and 4 SPACES</p> <p>These have a total of 3 'thick' bars, coded 1, and 6 'thin' bars, coded 0. There is also a thin white space between each of the coded characters.</p> <p>So A is coded</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <table style="border-collapse: collapse; text-align: center;"> <tr> <td style="padding-right: 10px;">BARS</td> <td style="padding-right: 5px;">1</td> <td style="padding-right: 5px;">0</td> <td style="padding-right: 5px;">0</td> <td style="padding-right: 5px;">0</td> <td style="padding-right: 5px;">1</td> </tr> <tr> <td></td> <td style="padding: 0 5px;">█</td> </tr> <tr> <td style="padding-right: 10px;">SPACES</td> <td style="padding-right: 5px;">0</td> <td style="padding-right: 5px;">0</td> <td style="padding-right: 5px;">1</td> <td style="padding-right: 5px;">0</td> <td></td> </tr> <tr> <td></td> <td style="padding: 0 5px;">█</td> </tr> </table> </div> <p>T: What is the difference in thickness between '1's and '0's'? (<i>'1's are twice as thick as '0's'</i>)</p> <p>T: What is the total length of any code? (<i>12, using one unit for each '0' and two units for each '1', i.e. $6 \times 1 + 3 \times 2 = 12$</i>)</p> <p>T: Put your code sheet 9.4 away: see if you can now identify 1, 2 and 3 from the first sheet (OS 9.1).</p> <p style="text-align: right; padding-right: 20px;"><i>15 mins</i></p>	BARS	1	0	0	0	1		█	█	█	█	█	SPACES	0	0	1	0			█	█	█	█	█	<p style="text-align: center;">Notes</p> <p>T: Teacher P: Pupil Ex.B: Exercise Book</p> <p>Interactive discussion on the different types of codes and their uses. Codes are designed for a particular purpose.</p> <p>T asks Ps for other situations when names, and possibly numbers, need to be coded.</p> <p>T shows OS 9.1 and gives a copy of it to each pair of Ps.</p> <p>T also gives each pair a copy of OS 9.4.</p> <p>T either puts the code for A on the board or uses the grid on OS 9.4.</p> <p>T asks Ps questions, making sure that they all understand.</p> <p>Ps can write on their copies of OS 9.1 if they find it helpful. They should all attempt to identify the numbers before checking their answers.</p> <p>Interactive checking orchestrated by T.</p>
BARS	1	0	0	0	1																					
	█	█	█	█	█																					
SPACES	0	0	1	0																						
	█	█	█	█	█																					
<p>2</p> <p><i>(continued)</i></p>	<p>Number of configurations</p> <p>T: Let's try to find out how many codes are available. How can we do this? (<i>? Suggestions ...</i>)</p> <p>T: Consider the case if we have just one wide bar. How many thin bars will there be? (<i>3</i>)</p> <p>T: How can we write this? (<i>1 0 0 0</i>)</p> <p>T: Can we write it in any other way? (<i>0 1 0 0, 0 0 1 0, 0 0 0 1</i>)</p> <p>T: So we have 4 ways of allocating the 'SPACE'.</p> <p>T: What about BARS with just 2 wide? How many ways are there of doing this?</p>	<p>T collects Ps' copies of OS 9.4 before starting, or gets them to put them out of sight.</p> <p>Ps ideas are used for calculating the table.</p> <p>T should encourage Ps to play an active part in the discussion but must steer them in the right direction; OS 9.2 could be used here.</p> <p>2 or 3 minutes are given for Ps to consider this.</p>																								

