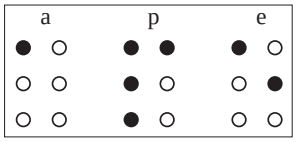
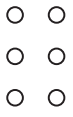
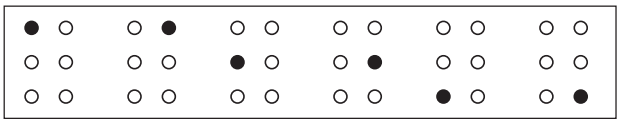
Codes and Ciphers	**UNIT 2** *Braille* Lesson Plan 1	*Braille*
Activity		***Notes***
		T: Teacher P: Pupil Ex.B: Exercise Book
1	**Introduction** T: What code, designed more than 150 years ago, is still used extensively today? T: The system of raised dots which enables blind people to read was designed in 1833 by a Frenchman, Louis Braille. Does anyone know how it works? T: Braille uses a system of dots, either raised or not, arranged in 3 rows and 2 columns. Here are some possible codes:  T: What do you notice? *(They use different numbers of dots)* T: We will find out how many possible patterns there are. *10 mins*	Whole class interactive discussion. Ps might also suggest Morse code or semaphore. Ps might have some ideas but are unlikely to know that Braille uses a 3×2 configuration.  on whiteboard (WB). T puts these three Braille letters on WB.
2	**Number of patterns** T: How can we find out how many patterns there are? *(Find as many as possible)* T: OK – but let us be systematic in our search. What could we first find? *(All patterns with one dot)* T: Good; who would like to display these on the board?  (or use **OS 2.1**) T: Working in your exercise books (with squared paper), now find all possible patterns with just 2 dots. T: How many have you found? T (chooses pupil with the largest number of patterns): Draw your solutions quickly on the board and explain how you found them. T: Well done. Now see how many you can find using 3 dots; work in pairs and work systematically. T: Here are the possible patterns: **OS 2.1** T: Is it easy now to finish? Why? *(Yes; symmetry)* T: 4 dots 'on' is the same as 4 dots 'off', i.e. 2 dots 'on'. So how many patterns are there with 4 dots on? *(15)* T: 5 dots on? *(6)* T: 6 dots on? *(1)*	Response will vary according to age and ability. P(s) put possible solutions on the board; T stresses the logical search for these. Agreement. Praising. Allow about 5 minutes for this before reviewing. It is important to stress the logical and systematic working needed. They will need 5 minutes for this. Discuss why there is no need for further investigation.
(continued)	T: We can complete the table now.	T asks Ps to put in values.

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2 *(continued)*	**OS 2.2** T: So we have a total of 64 patterns but, in practice, the zero dots pattern is not used, so there are 63.	
	30 mins	
3	**Allocating letters and numbers** T: How many letters are there to code? *(26)* T: How many digits? *(10)* T: What also needs coding? *(Punctuation, capital letters, mathematical symbols, accents, etc.)* T: Are 63 patterns enough? *(No)* T: So how can Braille be adapted so that there are enough patterns? T: Braille includes a number sign, a capital letter sign, a letter sign, etc. so that one pattern, for example, ● ○ / ○ ○ / ○ ○ can represent 1, A and a. **OS 2.3** T: Now you can see how it is done!	Whole class interactive discussion. Give Ps a chance to think about possible strategies. A copy of **OS 2.3** is given to each P.
	40 mins	
4	**Practice** T: You have just 5 minutes to decode these two messages. **OS 2.4**	Copy of **OS 2.4** (Exercise 3 from Pupil Text) for each P. Individual or paired work. Interactive review and discussion.
	45 mins	
	Homework Activity 2 Activity 1 (for high achievers)	