Codes and Ciphers	**UNIT 6** *Genetic Fingerprinting* Lesson Plan 1	

Activity		**Notes**
1	**Introduction to context**	T: Teacher P: Pupil Ex.B: Exercise Book
	T: What do you know about genetic fingerprinting, ... DNA?	Interactive discussion; T lets Ps with knowledge inform others.
	T: The basic concept used in genetic fingerprinting is illustrated on the slide.	**OS 6.1** and **6.2** are shown.
	T: The probability of matching ONE band in unrelated people is about one in four.	
	How do we express this as a probability? *($\frac{1}{4}$, 0.25)*	
	Normally between 10 and 20 bands are compared, so we need to calculate the probability of a complete matching of all the bands used.	
	T: What is the probability of two bands matching?	Some revision of independent events may be needed before proceeding.
	$\left(\left(\frac{1}{4} \right)^2 = \frac{1}{16} \text{ or 1 in 16} \right)$	
	10 mins	
2	**Activity**	Ps work in pairs; T monitors their progress and then reviews answers by choosing Ps to present their solutions on the board. Other students agree/ disagree.
	Activities 1 and 2 from Text to reinforce concepts.	
	20 mins	
3	**Generalisation**	T should encourage Ps to put forward their conclusions clearly.
	T: From the activities, what do you conclude about the results? *(Dependence on n and p)*	
	T: Given that the population of the UK is about 60 million, what number of bands should be compared to ensure that validity of the result?	This needs some discussion; lawyers have argued that a chance of 1 in 50 million is *not* sufficient to constitute a proof in law.
		Encourage students to discuss the difference between a proof in mathematics and a proof (or rather conviction) in law.
	T: Now complete Activity 3 from your Text.	Time should be allowed for Ps to present their calculations. Answers should be reviewed interactively.
	35 mins	
4	**Applications**	T should allow Ps a few minutes to discuss the problem and calculate their answers.
	T: The population of the USA is 220 million. How many bands need to be compared to be sure that results are valid?	
	T: Who wants to present their solution?	
	P: If $p = 0.25$, $n = 15$ gives probability of matching of 1 in one thousand million. This is too high!	
(continued)		

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Activity **4** *(continued)*	$n = 14 \implies$ probability $= (0.25)^{14}$ or 1 in 268 million. May be just OK, but safer to compare 15 or more bands to be sure. ———— *45 mins* ————	**Notes**
	Homework Activity 4 (c) or Extension for more able Ps.	