

UNIT 14 *Morse Code*

Teacher Resource Material

Key Stage: 3 or 4

Target: Year 9

Teaching Notes

This is an interesting historical topic which could be used jointly with History colleagues. The mathematical level is not high (unless you continue into the correlation activity set for homework). There is, though, a requirement for logical thinking in order to follow the material in this unit.

Throughout this unit we refer to Morse code for the alphabet with each letter code comprising up to 4 dots or dashes in total. Other, longer codes are used for punctuation and for numbers. (The symbol '@' has been included since December 2003 – the first change to Morse code since before World War II.)

Information on Samuel Morse can be found at

http://www.acmi.net.au/AIC/What_Hath_God_Wrought.html

Solutions and Notes

Activity 1 You could use

<i>Letter</i>	<i>Code</i>	<i>Time</i>
S	•	1
O	• •	2
S	•	1

so that SOS would have total length $1 + 2 + 1 + 3 + 3 = 10$ units of time (including spaces between letters).

Morse code was designed for *any* messages, not specifically for SOS, so the codes of shortest lengths have been allocated to letters which occur most frequently. Also, the code for SOS is easily remembered and hence known by most people.

Activity 2

<i>Code</i>	<i>Length</i>	<i>Code</i>	<i>Length</i>	<i>Code</i>	<i>Length</i>	<i>Code</i>	<i>Length</i>
•	1	• •	2	• • •	3	• • • •	4
—	3	• —	4	• • —	5	• • • —	6
		— •	4	• — •	5	• • — •	6
		— —	6	— • •	5	• • — —	8
				— — •	7	• — • •	6
				— • —	7	• — • —	8
				• — —	7	• — — •	8
				— — —	9	• — — —	10
						— • • •	6
						— • • —	8
						— • — •	8
						— — • •	10
						— — • —	10
						— — — —	12

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Teacher Resource Material (continued)

<i>Activity 3 a) and b)</i>	<i>Code</i>	<i>Transmission time</i>	<i>Letter in frequency order</i>
	●	1	E
	● ●	2	T
	—	3	A
	● ● ●	3	O
	● —	4	N
	— ●	4	R
	● ● ● ●	4	I
	● ● —	5	S
	● — ●	5	H
	— ● ●	5	D
	— —	6	L
	● ● ● —	6	F
	● ● — ●	6	C
	● — ● ●	6	U
	— ● ● ●	6	M
	— — ●	7	G
	— ● —	7	P
	● — —	7	Y
	● ● — —	8	W
	● — ● —	8	B
	● — — ●	8	V
	— ● ● —	8	K
	— ● — ●	8	X
	— — ● ●	8	J
	— — —	9	Q
	● — — —	10	Z
	— ● — —	10	
	— — ● —	10	
	— — — ●	10	
	— — — —	12	

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Teacher Resource Material (continued)

<i>Code</i>	<i>Transmission time</i>	<i>Letter in Morse code</i>
●	1	E
● ●	2	I
—	3	T
● ● ●	3	S
● —	4	A
— ●	4	N
● ● ● ●	4	H
● ● —	5	U
● — ●	5	R
— ● ●	5	D
— —	6	M
● ● ● —	6	V
● ● — ●	6	F
● — ● ●	6	L
— ● ● ●	6	B
— — ●	7	G
— ● —	7	K
● — —	7	W
● ● — —	8	
● — ● —	8	
● — — ●	8	P
— ● ● —	8	X
— ● — ●	8	C
— — ● ●	8	Z
— — —	9	O
● — — —	10	J
— ● — —	10	Y
— — ● —	10	Q
— — — ●	10	
— — — —	12	

There is broad agreement between the two lists but with much variation!

Activity 4 The codes not used in Morse code are

<i>Code</i>	<i>Length</i>
● ● — —	8
● — ● —	8
— — — ●	10
— — — —	12

The last two correspond to the codes with longest length but, perhaps surprisingly, the first two do not.