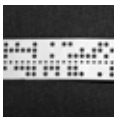
CODE SQUARES

TEACHERS' NOTES

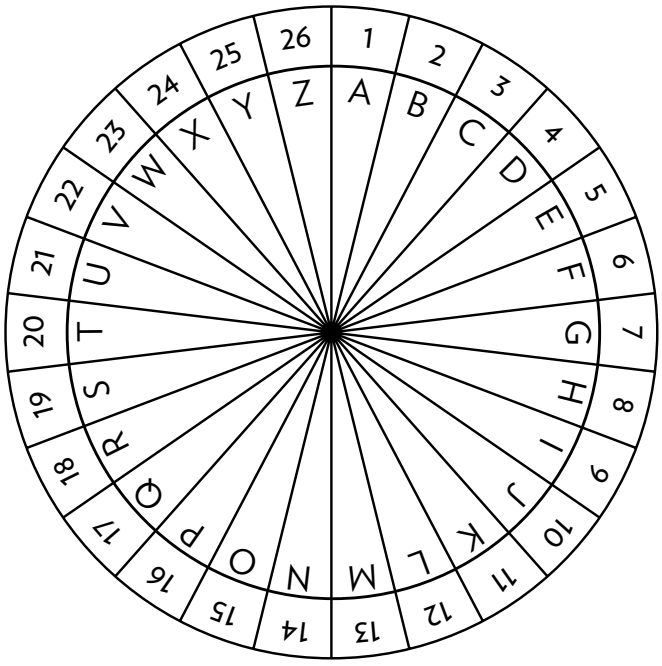
To break the Enigma code the codebreakers had to use lots of small bits of information to find the full code and decipher the message.

Can you decipher this message?
You will need to work out the value of each picture, do some adding and use the code wheel below.

MESSAGE

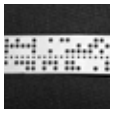
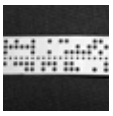
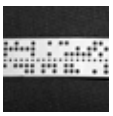
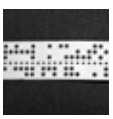
							
							
							

CODE WHEEL



Key Stage 3

Step 1: Work out the value of each picture

			9
			8
			8
			7
			17
			8
			13
			17
			14
			16

Picture	Value
	
	
	
	
	
	
	
	
	

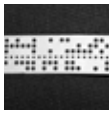
Calculations

Step 2: Add up the values of the pictures in each column of the message.
Write the numbers in the white boxes.

Step 3: Look up each number on the code wheel to find the message.
Write the numbers in the shaded boxes.

TEACHERS' NOTES

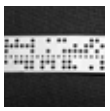
Students calculate the values of the images below, add them together to determine the numerical cipher text and then use a substitution cipher to find the final plain text.

Picture	Further Information
	A cog from a Lorenz machine. Lorenz was the German High Command's cipher. It was even more complex than Enigma. Colossus, the first computer, was developed to break the Lorenz cipher.
	An Enigma monthly settings sheet. Enigma settings changed daily at midnight Berlin time. The monthly sheets told Enigma operators how to set their machine up every day. These were closely guarded - if the Allies got hold of them it would tell them almost everything they needed to know to break Enigma for a month.
	This is an Enigma machine. To set it up the correct rotors had to be placed into the machine with the correct ring settings. The plugboard (visible at the front) also had to be connected correctly. To encipher a message you typed the message on the keyboard and wrote down the letters that lit up on the lampboard.
	The codebreakers worked in huts like this. Every hut had its own task and you were only allowed in your hut. This was to make sure everything was kept secret and the work was done efficiently. There was too much work for one person or small group of people to do everything.
	A telephone in the library. There were no computers, no internet and no mobile phones so information was communicated by telephones like this. You had to be very careful what you said because spies could listen in.
	Enigma rotors. Most Enigma machines used 3 rotors. The operator had to choose the correct 3 rotors from a choice of 5 and set them to the correct ring setting (the numbers on the side of the rotor.) This changed every day.
	Enigma messages were sent using Morse code but Lorenz was sent by teleprinter machines. Each letter, number and punctuation mark had a different sound. When the sound was received the teleprinter punched holes in tape. Every sound had a different combination of holes which was read by a tape reader machine which automatically typed the message.
	Alan Turing's office was in Hut 8. He didn't like other people using his mug so he chained it to the radiator. Do you know anyone like that?
	No computers meant no word processing so everything was hand written or typed on a manual typewriter. The typewriter keyboard is the same as our modern day keyboards but not the same as Enigma machine keyboards. Z, Y, and P were in different places on Enigma machines because of the frequency of these letters in German.

Top Secret, teacher's eyes only

			9
			8
			8
			7
			17
			8
			13
			17
			14
			16

Picture	Value
	3
	2
	4
	6
	1
	8
	5
	9
	7

								
+								
+								
	3/c	15/o	13/m	16/p	21/u	20/t	5/e	18/r