Create your own key

Make a simple cipher process based on the Tunny.

Use the key grid. Give each letter of the alphabet a new letter.
(**a**, **b** and **c** in for you.)

Original letter –	a	b	c	d	e	f	g	h	i	j	k	l	m
Code letter –			a										

Original letter –	n	o	p	q	r	s	t	u	v	w	x	y	z
Code letter –							b						c

This is your '**key**'. It is like the chart used to control the settings for the German Lorenz machine (the Tunny).

In the top row of the grid write a short message (something like "send more troops").
In the bottom row write your code letter from the **key** grid above.

Original message –	s	e	n	d		m	o	r	e		t	r	o	o	p	s				
Coded message –																				

Well done. You have created an encrypted message!

Use your key to write a **coded** message on the top line of the grid below.
Swap your sheet with a partner. They will work as a cryptographer and use your **key** to reveal the mystery message.

Code –																									

A cipher wheel

1. Cut out the circles at the bottom of the page.
2. Make a hole in the centre of each circle.
3. Use a split pin to fasten the circles together.

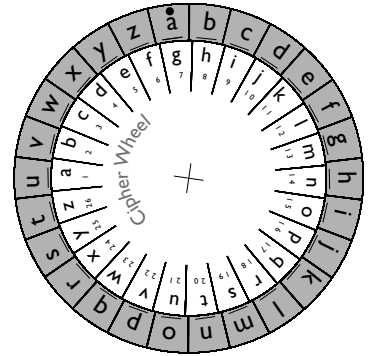The numbers on the cipher wheel are your **setting numbers**.

Just like the Germans you are going to change the **settings**.

When the wheels are set to **1** all the numbers line up and there is no encryption.

Turn the top wheel to a new setting and the letters will be mixed up

Example

This cipher wheel is on setting 7.

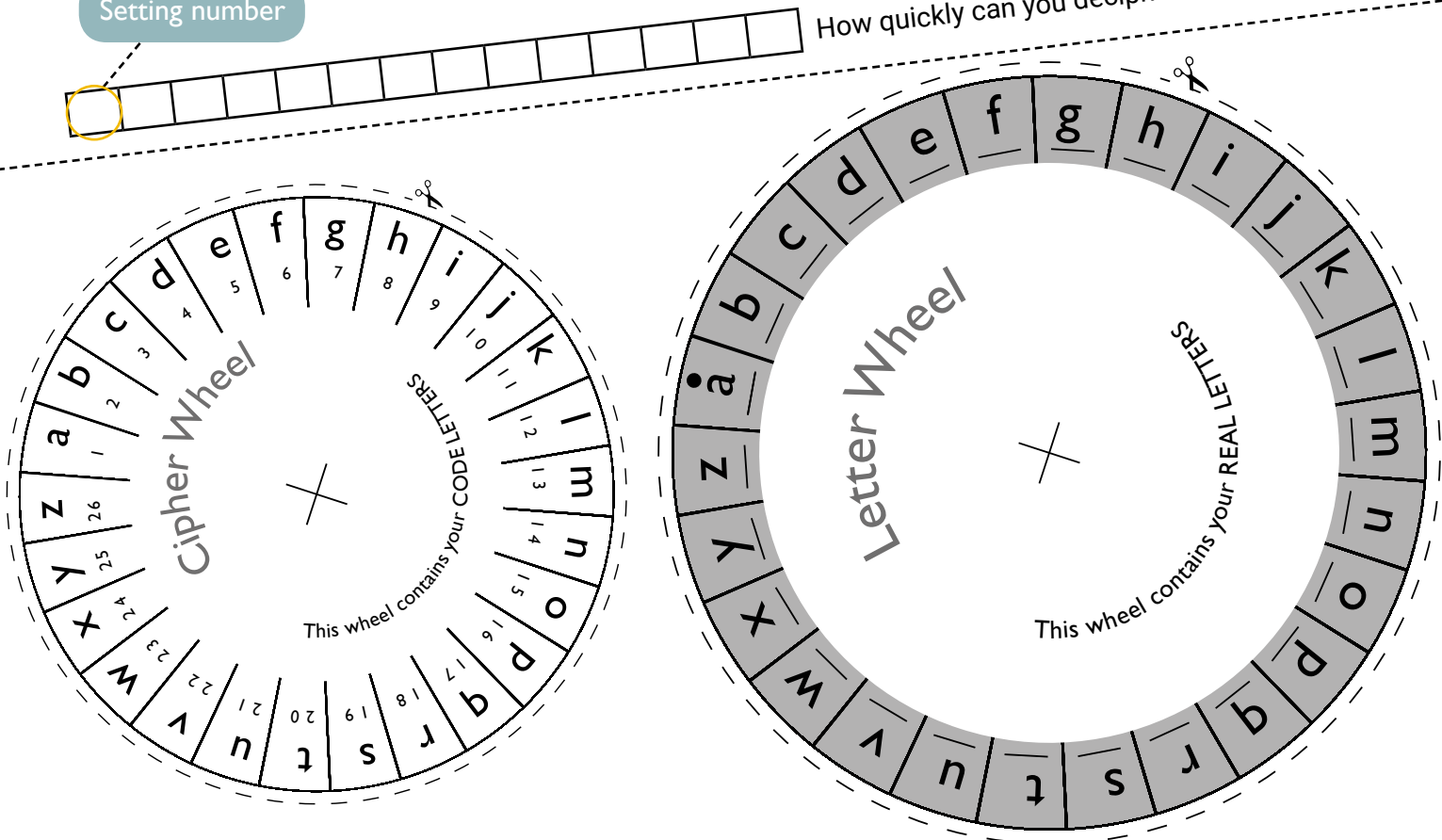The word 'hello' now becomes:
7nkrru

Pick a number (1 – 26). Line your number up with the letter '**a**' on the big grey letter wheel.

Encrypt a word using your wheel. Pass the encrypted word to a partner but make sure your word starts with your setting number.

For example: **9abwx** means **stop**

How quickly can you decipher each other's word?

Setting number

Binary code

To send messages as radio signals, the Germans changed alphabetic letters into five-bit binary code.

Each digit or letter has its own binary code.

Letters		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Code Elements	1	o	o		o	o	o			o	o							o		o		o		o	o	o	o
	2	o		o				o	o	o	o	o	o				o	o	o			o	o	o			
	3			o			o		o	o		o		o	o		o	o		o		o	o		o	o	
	4		o	o	o		o	o			o	o		o	o	o			o				o		o		
	5		o					o	o				o	o		o	o	o			o		o	o	o	o	o

Use the grid below to spell out your name. Write each letter in a box on the top row.

Below each letter, mark on the correct binary code.

Letters																							
Code Elements	1																						
	2																						
	3																						
	4																						
	5																						

Punched tapes

Binary codes are punched onto tapes. The Colossus machine read the tapes to work out the settings of the German Lorenz cipher machine.

Can you work out the binary message in the grid below?
Write the plain text letters in the top row of the grid.

Letters															
Code Elements	1				o		o		o	o					
	2			o			o		o			o			
	3	o		o				o	o	o		o		o	
	4	o	o	o				o	o			o	o	o	
	5	o	o	o		o						o		o	o