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(Codes and Ciphers)

Code

- A code is a system of signals that is used to represent letters or numbers in transmitting a message.
- In other words, a code deals with phrases and sentences or whole words.
- In a true code, symbols stand for ideas.
- A code attaches meaning to individual symbols.
- For example, this symbol means:



= "Send help at once."

Code Phrase

- The word "Grandpa" is a code for "Are you coming?"
- The word "Picking" is a code for "I will see you."
- The word "Apples" is a code for "come at 5:00."
- The word "Dad" is a code for "Bring a friend."
- "Eating" is a code for "thanks"

Here is the message:

"Grandpa Is Washing Apples So is Dad."

grandpa apples dad is the true message... the other words are there to throw your enemy off – and make the message sound innocent.

Ciphers

- A cipher deals with letters. It is a message written in letters in a predetermined way. This means that a cipher is a system of communication that uses letters instead of phrases and such.
- **CIPHER** uses **SINGLE LETTERS**. These are either jumbled up or replaced by other letters, numbers or symbols. Complicated ciphers involve both. Ciphers can be memorized so a codebook may not be needed.

CIPHER EXAMPLE:

A	B	C	D	E	F	G
1	2	3	4	5	6	7
H	I	J	K	L	M	N
8	9	10	11	12	13	14
O	P	Q	R	S	T	U
15	16	17	18	19	20	21
V	W	X	Y	Z		
22	23	24	25	26		

See if you can figure this one out. **9 -19\ 20-8-9-19\ 6-21-14?**

Is this fun?

2nd Letter Cipher

- Read every second letter starting at the first letter, and when you finish, start again on the letters you missed the first time!

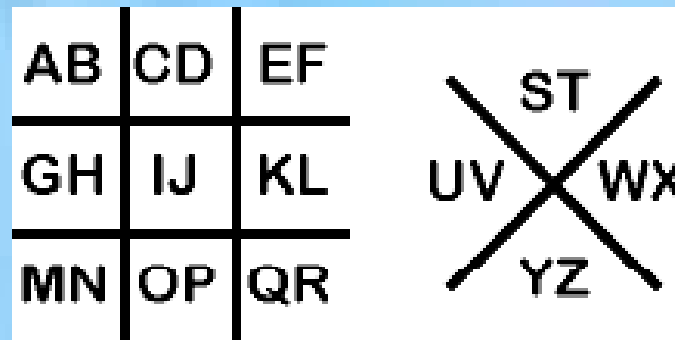
- **Here's a cipher for you to solve:**

M R E K E A T T M M E I I D N N T I H G E H P T A

Meet me in the park at midnight

Pig Pen Cipher

- This cipher was made up during the Civil War by a Union prisoner to send messages to his friends on the outside
- First you write out the whole alphabet in two grids, as shown:



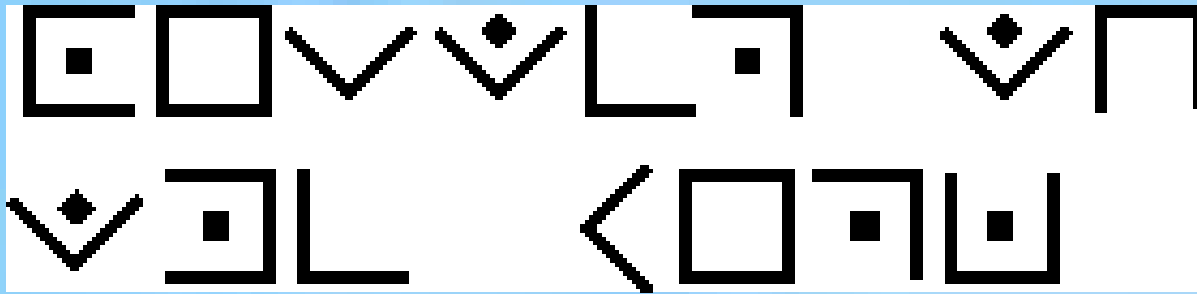
- Each letter is represented by the part of the "pigpen" that surrounds it. If it's the second letter in the box, then it has a dot in the middle.
- So an A looks like this:



And a B looks like this:



Example:



- This is deciphered as
"LISTEN TO THE WIND".

Braille is an example of a Cipher

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				
⠣	⠦	⠡	⠤	⠥	⠵				

What does this message say?:



Morse Code is really a cipher

- Morse (Cipher) is sometimes written with a slash (/) between letters, to stop you from getting the letters confused. A double slash (//) means a break between words.
- **Example:**
SOS = .../---/...

Is Morse Code faster than texting?

INTERNATIONAL MORSE CODE

1. A dash is equal to three dots.
2. The space between parts of the same letter is equal to one dot.
3. The space between two letters is equal to three dots.
4. The space between two words is equal to five dots.

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 — — • •

1 • — — — —
2 • • — — —
3 • • • — —
4 • • • • —
5 • • • • •
6 — • • • •
7 — — • • •
8 — — — • •
9 — — — — •
0 — — — — —

Sir Francis Bacon's Substitution Cipher

A=*****	N=*BB*B
B=****B	O=*BBB*
C=***B*	P=*BBBB
D=**BB	Q=B****
E=**B**	R=B***B
F=**B*B	S=B**B*
G=**BB	T=B**BB
H=**BBB	U=B*B**
I= *B***	V=B*B*B
J=*B**B	W=B*BB*
K=*B*B*	X=B*BBB
L=*B*BB	Y=BB***
M=*BB**	Z=BB**B

- Francis Bacon created one of the more interesting substitution ciphers.
- He used two different type faces (one regular, one bold).
- He broke up his cipher text into 5 character groups, each of which would represent one character in his plaintext.
- Depending on which characters of the group were bold, one could determine the plaintext character using the table (* stands for a plain character and B for a bold character)

Try this one...

A=*****
B=****B
C=***B*
D=***BB
E=**B**
F=**B*B
G=**BB
H=**BBB
I= *B***
J=*B**B
K=*B*B*
L=*B*BB
M=*BB**

N=*BB*B
O=*BBB*
P=*BBBB
Q=B****
R=B***B
S=B**B*
T=B**BB
U=B*B**
V=B*B*B
W=B*BB*
X=B*BBB
Y=BB***
Z=BB**B

To be or not to be that is the question. Whether 'tis nobler in the mind to suffer the slings and arrows of outrageous fortune or to take arms against a sea of troubles and by opposing end them?

M E E T M E

To decipher, we just break the characters into groups of 5 and use the key to find the plaintext message.

To be or not to be that is the question

“Code” word Cipher

- You can make a cipher based on a special word which only you know about...such as the word "XYLOPHONE".
- First of all we write down the normal alphabet (it's called the Plain Text alphabet), and below it we write the Cipher alphabet, starting with the word, and following the word with the rest of the alphabet.
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- But there's a trick to this - remember that you don't want repeated letters! So you have to leave out the second O in XYLOPHONE, and when you get to the normal alphabet you write down ABCDFGI... leaving out the E, the H, and any other letters in the codeword.
- So here's what the alphabet looks like when you're finished:
Plain text: ABCDEFGHIJKLMNOPQRSTUVWXYZ
Code: XYLOPHNEABCDEFGHIJKMQRSTUVWXYZ
- When you're solving this code, remember to look up the letter in the Code alphabet. So the letter S is decoded as U, because U is above S.
QLISR is decoded as SCOUT

Block Cipher

- We write the message in a rectangular block, one row at a time, and then read off the columns.
- To encipher the message **THIS IS VERY EASY!**, write it in a block like this:

```
THIS I  
S V E R Y  
E A S Y !
```

- The ciphered message is read by looking at the columns, and writing them out like this:

TSE HVA IES SRY IY!

- To decipher it, just write all the words in a block again, as columns, and then read the message across the rows.