Name: _____   Pd: _____   Date: _____

CRYPTOGRAPHY!

Morse Code

A ●—	J ●———	S ●●●
B —●●●	K —●—	T —
C —●—●	L ●—●●	U ●●—
D —●●	M ——	V ●●●—
E ●	N —●	W ●——
F ●●—●	O ———	X —●●—
G ——●	P ●——●	Y —●——
H ●●●●	Q ——●—	Z ——●●
I ●●	R ●—●	

Types of Codes!

- **Morse Code:** An alphabet code where each character is represented by sequences of dots and dashes, which can be communicated by short and long audio beeps or flashes of light (key to the right).

- **Atbash Cipher:** The alphabet is mapped in reverse, so that the first letter becomes the last, etc.

Atbash cipher																									
Cryptogram	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A
Meaning	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

- **Caesar Cipher (or Shift Cipher):** Each character in the message is shifted by a fixed number of positions down the alphabet.
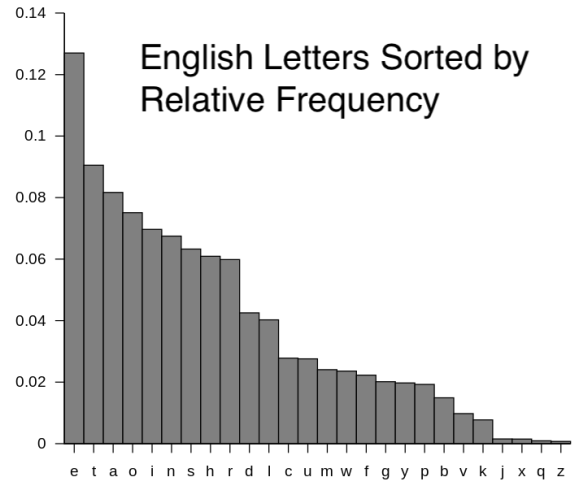
- **Vigenere Cipher (AKA the Indecipherable Cipher!):** A type of Caesar cipher where each character is shifted down the alphabet by a varying number of positions according to a key (usually a word, phrase, or sequence of numbers) held by both the sender and the recipient of the encoded message. *NOTE: This type of cipher cannot easily be cracked by frequency analysis because the same letters will be encoded differently throughout the message!*

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

Tips for Cracking the Code!

- **Frequency Analysis By Letter:** certain letters are more common in English. Characters that show up more frequently in an encoded message likely represent more common letters (see graph).
- **Frequency Analysis By Word:** Cross reference patterns of letters with the most common English words.
    - 1 Letter: a or I
    - 2 Letters: be, to, of, in, we, on, an, it
    - 3 Letters: the, and, for, not

English Letters Sorted by Relative Frequency

e t a o i n s h r d l c u m w f g y p b v k j x q z

Let's Practice! (Easy)

1. After someone shot him during a campaign speech in 2012, Teddy Roosevelt may have sent out this campaign message to his supporters via telegraph:

    -.-- --- ..- | -.-. .- -. - | -.- .. .-.. .-.. | .- | -... ..- .-.. .-.. | -- --- --- ... .

    Decoded: _ _ _   _ _ _ _   _ _ _ _   _   _ _ _ _   _ _ _ _ _

Type of Cipher: _____

2. The Black Hand may have sent this message to its members on 27 June 1914:

    Gsv Zixswfpv wrvh glnliild. Wldm drgs gsv Zfhgirzmh! Olmt orev gsv Hviyh!

Decoded: _____

Type of Cipher: _____

Medium Difficulty

3. American troops might yell out this battlecry on their way to war:

    WJRJRGJW YMJ QZXNYFSNF!

Decoded: _____

Type of Cipher: _____

4. This motto seemed ridiculous by the end of WWI.

    .-. -... ... .--- .-.. | .-.. .- | .-. .-.. .--- ...- -.-- -... - | .-.. --.. .-

Translated: _ _ _ _ _   _ _   _ _ _ _ _ _ _   _ _ _

Decoded: _____

TYPES of Cipher: _____ & _____

IMPOSSIBLE DIFFICULTY (or INDECIPHERABLE)

5. Unfortunately for the next generation, this nickname for WWI was incorrect. **KEYWORD: FRANZ**

    yye jzw ko rmi rly vfis