YEAR 7 HOMEWORK

AUTUMN 1

CODEBREAKING

Please return to your maths teacher, once completed, for the answers.

Cryptanalysis of a substitution cipher using 5 letter groups

Follow the steps below to recover the plaintext of a substitution cipher.

1. Make a frequency count of the letters occurring in the cipher, i.e. count how many times A, B, C, … X, Y, Z occur (use the table provided).

2. Attempt to identify which cipher character represents a space. This should be easy since space and punctuation symbols account for between 15 and 20 percent of a typical English text. It is highly likely that the most frequently occurring cipher letter represents space.

3. Having identified *space cipher character* rewrite the text with a real space replacing the cipher character representing it. The cipher text will now appear as a collection of separated cipher words, which are of the same length and structure as the plain text words. So, for example, if a plain text word has repeated letters so will the cipher version.

4. Attempt to identify the cipher representations of some of the high frequency letters such as E, T, A, I, O and N. These would normally account for over 40 percent of the entire text , with E being by far the most common letter in most texts.

5. With some parts of words identified in this way look for short words with one or two letters known, for example if we know T and E and see a three-letter word with an unknown letter between the T and the E then the word is probably THE and the unknown letter is H. Recovery of words such as THIS, THAT, THERE and THEN will follow providing more cipher plain text pairings.

6. Complete the solution by using grammatical and contextual information and clues.

Question 1

This message, consisting of 53 letter groups, has been intercepted.

It is known that the cipher used to encode this message is a simple substitution cipher.

The same letter in the cipher text represents each letter and space in the original; also all the punctuation is ignored.
Your task is to recover the plain text of the message.

The cipher message is:

MJZYB LGESE CNCMQ YGXYS PYZDZ PMYGI IRLLC

PAYCK YKGWZ MCWZK YFRCM ZYVCX XZLZP MYXLG

WYTJS MYGPZ YWCAJ MYCWS ACPZY XGLYZ HSWBN

ZYXZT YTGRN VYMJC POYMJ SMYCX YMJZL ZYSLZ

YMTZP MQYMJ LZZYB ZGBNZ YCPYS YLGGW YMJZP

YMJZL ZYCKY SPYZD ZPKYI JSPIZ YMJSM YMJZL

ZYSLZ YMTGY GXYMJ ZWYTC MJYMJ ZYKSW ZYECL

MJVSQ YERMY MJCKY CKYKG

Cipher Text	Tally	Frequency	Plain Text Letter (use pencil)
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			

Question 2

An enciphered English text consisting of 202 characters has been found. It is known that a simple substitution cipher has been employed and that spaces have been replaced by H; and all other punctuation has been ignored. There are also reasons for thinking that the writer preferred to use the word THY rather than YOUR.

Recover the plaintext

VHEOC WZIHC BUUCW HDWZB IRWDH TDOZH VIHVI

YBWIU HQOWU HUFWH ZOXBI LHTBI LWDHG DBUWE

HVIRH FVXBI LHGDB UHZOX WEHOI HIODH VCCHU

FPHQB WUPHI ODHGB UHEFV CCHCN DWHBU HSVYJ

HUOHY VIYWC HFVCT HVHCB IWHIO DHVCC HUFPH

UWVDE HGVEF HONUH VHGOD RHOTH BU

Cipher Text	Tally	Frequency	Plain Text Letter (use pencil)
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			