

# OPERATION CODE CRACKER



**CAN YOU  
CRACK  
THIS  
SECRET  
MESSAGE?**

Below is a secret message. Each mathematical symbol and number combination (e.g. x3) can translate to a letter. You will use **FREQUENCY ANALYSIS** to crack the code. Count the number of times each symbol/number appears in the message using the grid below. Then follow the instructions on the following pages.

Here is an enciphered message found in a suspected spy's apartment. We believe it can tell us about a secret meeting somewhere in Washington, DC. Use the following pages to help you crack the code!

x3 -5 -5 +1      x3 -5      -1 +1      +1 ÷3 -5

x2 ÷2 x4 -3 x5 x2 x4

x3 -5 x3 x5 +3 ÷2 -1 x2

x3	-5	+1	-1	÷3	x2	÷2	x4	-3	x5	+3	-2
✓											
✓											
✓											
✓											
4											

**DESTROY THIS  AFTER READING**

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## FREQUENCY ANALYSIS: SOLVING SUBSTITUTION CIPHERS

We are assuming this message will decode into English—that means that each math symbol with a number will translate to a letter of the alphabet and each space between the symbols indicates a new word. You will use Frequency Analysis to crack this message. **Here's How:**

### Step 1:

Use the grid beneath the message to count how many times each symbol/number combination appears in the message (it's frequency).

### Step 2:

Look at your totals, which combination appears most? Consult page three to see which letter(s) in the English language appear most frequently.

### Step 3:

Use a pencil (you may need to erase) and try placing the most frequently used letter (E) under the most frequently appearing symbol.

### Step 4:

Now look at the patterns in the English language on page 3 and begin trying out letters until a word forms.

### Step 5:

Once you think you have a word, Go through the message and replace those same symbols with those same letters and try to solve this message.

### Step 6:

Don't get frustrated! Just keep trying different combinations.



**HINT:** We believe the message is about a secret meeting taking place somewhere in Washington, DC. The answer is on our SPY Facebook for Educators Page:

[www.facebook.com/spyeducators/](http://www.facebook.com/spyeducators/)

## PATTERNS OF THE ENGLISH LANGUAGE

**E** is the most common letter used in words. Other common letters:

**T, A, O, N, I, R, S, H**

Least commonly used letters:

**J, K, Q, X, Z**

Common double letter combinations:

**EE, OO, LL, TT, SS**

Some common two-letter combinations:

**EN, RE, ER, TH**

The only one-letter words:

**A & I**

More about the letter **A**:

**Often found at the beginning of the words and second from the last letter**

More about the letter **I**:

**Often found third from the last letter of a word (think...ing)**



Commonly used words:

**The, That, And, Will, A, I, Is, It, In**