

ENRICHMENT ACTIVITY 3-2

Variable Codes

A number has been assigned to each letter of the alphabet; A = 1, B = 2, and so on.

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	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

A simple substitution code works by replacing a letter with another that follows it at a certain distance in the alphabet. For example, if A is replaced by G, then an $x + 6$ code is being used, since G is 6 letters after A. With this code, the number for Y becomes $25 + 6 = 31$. Subtract 26 to get $31 - 26 = 5$, so the code letter for Y is C.

1. Use $x + 6$ to encode each word below.
 - a. JUICE _____
 - b. TOMORROW _____
 - c. MATHEMATICS _____
 - d. EXTRAORDINARY _____
2. Choose a number k and use $x + k$ to encode your name. State the value of k .

3. Decode the following message which has been encoded with $x + 12$.

U YGEF EFGPK RAD MZ QJMY

Name _____ Class _____ Date _____

4. Use $x - 9$ to encode each word below. If $x - 9$ is a negative number, add to 26 to get the coded letter.

a. GREAT _____

b. PUZZLE _____

c. ASSIGNMENT _____

d. EXPLORATION _____

5. Find the expression that could be used to decode each coded answer in Exercise 4.

6. Use $27 - x$ to encode MARCH and NOVEMBER. Describe in words how this code works. _____

7. a. Encode TUESDAY using $7 - x$. _____

b. Take the answer to part a and encode it using $7 - x$ again. What happens?

8. a. Use $x - 7$ to encode FRIDAY. _____

b. Take the answer to part a and encode it using $x - 7$ again. Did you get the

same result as in Exercise 7? _____