

## Lesson 2.3: Keeping Information Safe - Part 2

### Objectives

In this lesson, students will:

- ❖ Be introduced to a caesar cipher conversion table.
- ❖ Discover using techniques such as a conversion tables to improve the speed an accuracy of encrypting and decrypting
- ❖ Experience and practice encrypting a decrypting messages using Caesar Cipher

### Agenda

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|---|---------|
| 1. Review Encryption and Decryption             | 5 mins  |
| 2. Creating Conversion Tables for Caesar Cipher | 10 mins |
| 3. Student Activity: Writing Secret Messages    | 30 mins |
| 4. Wrap Up and Review the Student Activity      | 5 mins  |

### Preparation

- Print student activity worksheet, one per student.

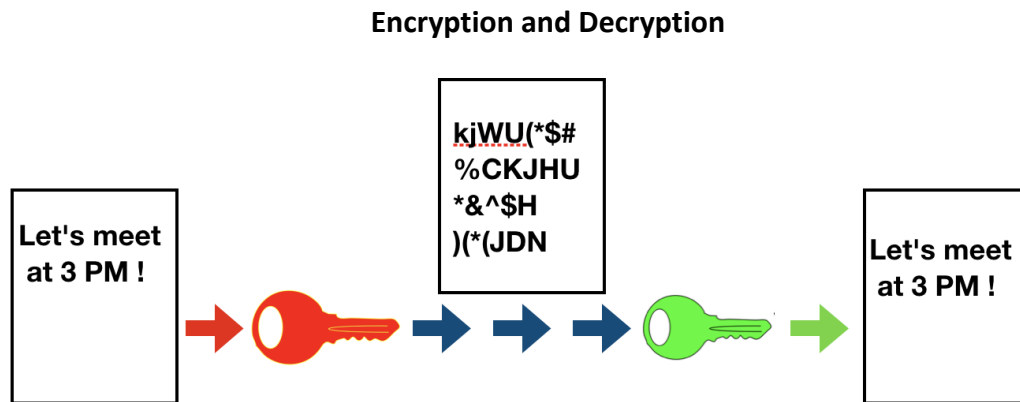
### Resources & Links

- Caesar Cipher video: <https://tinyurl.com/nwmks7m>

## 1. Review of Encryption & Decryption



A quick review of encryption and decryption and Caesar Cipher might be helpful.



## 2. Creating Conversion Tables for Caesar Cipher



In the last lesson we learned that with the Caesar Cipher encryption and decryption method each letter in the original message becomes a different letter in the encrypted message. A new letter in the alphabet is shifted by a certain number of positions, the shift value.

If you are encrypting or decrypting a long message, it would get pretty tedious and one can easily make mistakes counting forward and backward the shift value for each letter.

To help make the encryption and decryption process faster and less error prone, we can create a conversion table for our cipher. How do we do that?

Here is one way to do it:

1. Write down the entire alphabet in a row and draw another row below it.
2. Pick a key (shift value)
3. In the second row, enter the letter A by counting the number of letters of your key (shift value) to the right starting with the letter after A, i.e. B. Stress the fact that the counting begins with the letter after A.
4. Fill in the rest of the alphabet after the letter A you just entered. When you run out of space at the end, continue to put in the rest of the letters in the empty slots at the beginning.

You have now created a conversion table for your key value. This makes encrypting and decrypting much easier.

To use the table, for each letter in a word you want to encrypt, find it in the second row. The letter above it in the first row is the encrypted version.

For example to encrypt HI:


- a) Find H in the second row. Above it is the letter L.
- b) Find I in the second row. Above it is the letter M.
- c) So Hi encrypted is LM.


To decrypt, do the reverse. Find the letter in the first row and look up the plain text letter in the second row.

**Key : 4**

**1 2 3 4**

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
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


  
Next letter goes to the beginning


  
This is where the alphabet starts for encrypting a message

Encrypt and decrypt a word together with the class to demonstrate how to use the conversion table.

### 3. Student Activity: Writing Secret Messages



Students work in pairs for this activity. Each student receives a copy of the activity worksheet.

**Explain** the activity to students. Students work on exercise 1 and 2. You may want to tell students to limit the secret message to no more than 3 words or any other length you choose.

Exercise number 3 is optional if time allows.

#### 4. Wrap Up and Review of Student Activity

Review the student activity with students. Optionally use the following reflection points.



##### Reflection Points:

- What did you like about today's activity?
- What is the purpose of the conversion table?
- What is Caesar Cipher? How does it work?
- What are reasons for wanting to encrypt a message?

## Student Activity: Writing Secret Messages

### 1. Creating a conversion table for your cipher

What to do:

- With your partner agree on a key (your shift value) \_\_\_\_\_
- In the second row, enter the letter A by shifting (moving to the right) your key value. If your shift value is 5, you would write **A** in the box below **F**.
- Fill in the rest of the alphabet. Continue at the beginning when you reach the end.

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

### 2. Encrypt and decrypt of a secret message

Each Partner-What to do:	Using/Details:
Choose a <b>secret message</b>	Don't let your partner see it
Encrypt your message	Use the conversion table
Give your encrypted message to your partner and tell them the shift value	Example: XHNSKPT MJHSY
Decrypt your partner's secret message	Use the conversion table
Check with your partner if you discovered the secret message	

## Extra Student Activity

### Encryption and decryption using a secret key

What to do:

- Repeat exercise 2 with a single word, but use a key that your partner does not know.
- Try to figure out what the secret message is by first trying to crack the key used by your partner. This is harder than you think :-)