More Transposition Ciphers: Rail Fence Cipher

Another type of transposition cipher (where you move the letters around) is called the rail fence cipher.

Encryption - To encrypt a message:
1. Write it in a zig-zag, without spaces:

   Hello World ⇒
   
   H L O O L
   E L W R D

2. To get the cipher text (encrypted message), first write down the letters in the top row, then the letters in the bottom row:

   H → L → O → O → L
   E → L → W → R → D ⇒ H L O O L E L W R D

   Encrypted message: HLOOLELWRD

Try to encrypt the following phrases (remember to write your encrypted message in CAPITALS.)

1. Market

2. Encrypt

3. Summer day

4. Phone Call
5. Dark Alley

________________________________________

________________________________________

6. I like cake

________________________________________

________________________________________

7. I can write codes

________________________________________

________________________________________

8. Today is a school day

________________________________________

________________________________________
Decryption - to decrypt a message:

1. Count the letters in the encrypted message:

   IERACCEM = 8 letters

2. Split the message in the middle

   IERA  CCEM

3. Write the message in two lines, spaced out, with the letters in the second line below the gaps:

   \[
   \begin{array}{cccc}
   I & \rightarrow & E & \rightarrow & R & \rightarrow & A \\
   C & \rightarrow & C & \rightarrow & E & \rightarrow & M
   \end{array}
   \]

3. To get the plain text (the decrypted message), read the letters in a zig-zag, starting with the top left corner. You’ll need to put any spaces in the correct places in the message:

   \[
   \begin{array}{ccccccc}
   I & \downarrow & E & \downarrow & R & \downarrow & A \\
   C & \downarrow & C & \downarrow & E & \downarrow & M
   \end{array}
   \]

   Decrypted message: Ice cream

Try to decrypt the following phrases (remember to write your decrypted message in \textit{lower case}.)

1. TOSRRUES  Number of letters: ___

   __________________________________________________________

   __________________________________________________________

2. EEHNLPAT  Number of letters: ___

   __________________________________________________________

   __________________________________________________________
How would you decrypt a message with an odd number of letters?  
(Hint: Think about how you write the word when you encrypt it.)

<table>
<thead>
<tr>
<th>Encrypted word</th>
<th>Number of letters</th>
<th>Show how you would split the encrypted word</th>
<th>Decrypted message</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. DOWYORA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. COOIERCDL</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Now decrypt these sentences:

5. HLOOLELWRD      Number of letters: ___

__________________________________________________________________________

__________________________

6. BUWAELEHL        Number of letters: ___

__________________________________________________________________________

__________________________

7. MTSSSFLAHIUEU    Number of letters: ___

__________________________________________________________________________

__________________________