SEX-LINKED INHERITANCE

◆ This is a form of inheritance where the gene/allele for the characteristic being studied is on the ________ chromosome.

◆ Diseases such as colour-blindness and haemophilia are inherited this way, and are more common in ________________ than females.

HAEMOPHILIA

◆ **Alleles, Genotypes and Phenotypes for Haemophilia (Blood-Clotting Inability)**

X_H – allele for normal blood clotting
X_h – allele for haemophilia

X_HX_H – genotype of normal female
X_hX_h – genotype of haemophiliac female
X_HX_h – genotype of carrier female (with normal blood-clotting ability, but who can pass the ___________ gene to her children)

X_HY – genotype of normal male
X_hY – genotype of haemophiliac male

◆ **Example 1 – Haemophilia**

A man with normal blood-clotting ability (X_HY) marries a woman who is a haemophiliac (X_hX_h). The possible phenotypes of their children are ...

<table>
<thead>
<tr>
<th></th>
<th>X_H</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>X_h</td>
<td>X_HX_h</td>
<td>X_hY</td>
</tr>
<tr>
<td>X_h</td>
<td>X_HX_h</td>
<td>X_hY</td>
</tr>
</tbody>
</table>

Possible genotypes = 1 X_HX_h : 1 X_hY
Possible phenotypes
= 1 ______________ female : 1 ______________ male

◆ **Example 2 – Haemophilia**

A normal woman (X_HX_H) marries a haemophiliac man (X_hY). The possible genotypes and phenotypes of the children are...

<table>
<thead>
<tr>
<th></th>
<th>X_H</th>
<th>X_h</th>
</tr>
</thead>
<tbody>
<tr>
<td>X_h</td>
<td>X_HX_h</td>
<td>X_HX_h</td>
</tr>
<tr>
<td>Y</td>
<td>X_hY</td>
<td>X_HY</td>
</tr>
</tbody>
</table>

Possible genotypes = 1 X_HX_h : 1X_hY
Possible phenotypes
= 1 ______________ female : 1 ______________ male
RED-GREEN COLOUR BLINDNESS

- **Alleles, Genotypes and Phenotypes for Colour-blindness**

  Xc - allele for normal colour vision
  Xc - allele for colour-blindness

  Xc Xc - genotype of normal female
  Xc Xc - genotype of colourblind female
  Xc Xc - genotype of carrier female (with normal colour vision, but who can pass the defective gene to her children)
  Xc Y - genotype of normal male
  Xc Y - genotype of colourblind male

- **Example 3 – Colour Blindness**

  A male with normal vision (XcY) and a colourblind female (Xc Xc) have children. The possible genotypes and phenotypes of the children are...

<table>
<thead>
<tr>
<th></th>
<th>Xc</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xc Xc</td>
<td>XcXc</td>
<td>XcY</td>
</tr>
<tr>
<td>Xc Xc</td>
<td>XcXc</td>
<td>XcY</td>
</tr>
</tbody>
</table>

Possible genotypes = __________________________________________

Possible phenotypes = __________________________________________

- **Example 4 – Colour Blindness**

  A carrier female (Xc Xc) marries a normal-visioned male (Xc Y). The possible genotypes and phenotypes of the children are...

<table>
<thead>
<tr>
<th></th>
<th>Xc</th>
<th>Xc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xc Xc</td>
<td>XcXc</td>
<td>XcXc</td>
</tr>
<tr>
<td>Y</td>
<td>XcY</td>
<td>XcY</td>
</tr>
</tbody>
</table>

Possible genotypes = __________________________________________

Possible phenotypes = __________________________________________