### Meiosis
- Homologous chromosomes are ________________
- Chiasmata are ________________
- Non-sister chromatids are ________________
- Independent assortment of alleles occurs because of random orientation of ________________
- During anaphase spindle fibres are responsible for ________________
- A difference between meiosis I and meiosis II is ________________

### Dihybrid inheritance
Gene locus (pl. loci) is ________________
Unlinked genes segregate independently because they are found on different ________________
Discrete variation in a phenotype can be identified because there are few ________________
Continuous variation is when the phenotype varies ________________ or there are many ________________
Polygenic characteristics have phenotypes which show continuous ________________
Human height is an example of a ________________

### Linkage notation
Morgan did some crosses with Drosophila flies. He crossed ebony body, scarlet eyed flies (es) with wild type (genotype EESS)
Because both the alleles are on chromosome 3 he used “linkage notation” Complete a punnet square using this notation.

<table>
<thead>
<tr>
<th>es</th>
<th>E</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>es</td>
<td>E</td>
<td>S</td>
</tr>
</tbody>
</table>

**Legend**
- E = allele for wildtype body
- e = allele for ebony body
- S = wild type allele - red eyes
- s = allele for scarlet eyes

Recombinant phenotypes would be ________________ and ________________

### Gene pools
A “gene pool” is ________________
Evolution involves allele frequencies changing in time. Explain why.

### Arrange the following chromosomes movements from meiosis in the right order:
- Double stranded chromosomes line up on the spindle
- Homologous chromosomes separate as they move to opposite poles of the cell
- Centromeres split & single stranded chromosomes more to opposite poles of the cell
- Pairs of homologous chromosomes form tetrads
- Homologous chromosomes line up on the equator of the spindle
- Nuclear membrane forms and four haploid cells are produced.

### Dihybrid crosses can have 4 x 4 Punnett square. Eg. AaBb x AaBb

<table>
<thead>
<tr>
<th>Aa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bb</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AB</th>
<th>AaBb</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB</td>
<td>AaBb</td>
</tr>
</tbody>
</table>

If one parent is homozygous then one row is enough.. AaBb x AaBb

<table>
<thead>
<tr>
<th>Aa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bb</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AB</th>
<th>Aaab</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aa</td>
<td>Aaab</td>
</tr>
</tbody>
</table>

AABB only has one possible type of gamete “AB”

### Explain why recombinant phenotypes would be lower in number than normal mendelian ratios with linked genes.

<table>
<thead>
<tr>
<th>AB</th>
<th>AaBb</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB</td>
<td>AaBb</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AB</th>
<th>Aabb</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB</td>
<td>Aabb</td>
</tr>
</tbody>
</table>

Why is it also likely that these will always be some recombinants, even with linked genes?

### Explain the 3 methods of reproductive isolation below.

<table>
<thead>
<tr>
<th>Cause of reproductive isolation</th>
<th>How it works</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geographical</td>
<td></td>
</tr>
<tr>
<td>Behavioural</td>
<td></td>
</tr>
<tr>
<td>Temporal</td>
<td></td>
</tr>
</tbody>
</table>

### Compare the 3 methods of reproductive isolation below.

<table>
<thead>
<tr>
<th>Explain how natural selection can be ‘stabilizing’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explain how reproductive isolation leads to speciation?</td>
</tr>
</tbody>
</table>

### In a cross between a brown rabbit with long fur and a white rabbit with short fur there were 4 phenotypes of offspring
- White short fur
- Brown short fur
- White long fur
- Brown long fur

Which are recombinants, explain why.

### Chi-squared test can be used to see if there is a significant difference between observed and expected values. Explain why you have to look up a probability once Χ² has been calculated?

<table>
<thead>
<tr>
<th>White long fur</th>
<th>White short fur</th>
<th>Brown long fur</th>
<th>Brown short fur</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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