3.2 Origins of Biodiversity

**Significant ideas:**

Evolution is a gradual change in the genetic character of populations over many generations achieved largely through the mechanism of natural selection.

Environmental change gives new challenges to species, which drives evolution diversity.

There have been major mass extinction events in the geological past.
1. Define Speciation

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2. Using the table, summarise the mechanism of natural selection.

<table>
<thead>
<tr>
<th></th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variation</td>
<td></td>
</tr>
<tr>
<td>Fitness</td>
<td></td>
</tr>
<tr>
<td>Reproductive success</td>
<td></td>
</tr>
<tr>
<td>Inheritance</td>
<td></td>
</tr>
</tbody>
</table>

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## Isolation of populations

1. List three physical barriers that might separate populations

2. Outline the factors which might provide different selection pressures on populations that have been split and separated.

3. Using modern nations/continents as reference, outline the structure of the ancient continent, "Gondwana".

4. With reference to plate tectonics, explain how Gondwana was transformed into the structure of continents we currently have on Earth.

5. Explain how land bridges may influence the evolution of species
# Mass Extinctions

1.  
   a) Outline what is meant by the term “background extinction rate”

   ____________________________________________________________________________
   ____________________________________________________________________________
   ____________________________________________________________________________
   ____________________________________________________________________________

   b) State the estimated background extinction rate, including the units.

   _____________________________________________________________

2.  
   a) Outline what is meant by the term “mass extinction”

   ____________________________________________________________________________
   ____________________________________________________________________________
   ____________________________________________________________________________
   ____________________________________________________________________________

   b) How many mass extinctions have occurred through geological history?

   __________________________

3. Outline three factors that may have resulted in mass extinctions in the past.

   ____________________________________________________________________________
   ____________________________________________________________________________
   ____________________________________________________________________________
4. Complete the table showing the details of mass extinctions through geological history

<table>
<thead>
<tr>
<th>Time (Millions of years ago)</th>
<th>Geological time period</th>
<th>Proportion of families lost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward in time</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: In biology a “family” is a type of group of species. A family contains anywhere up to a thousand species.
5. Discuss evidence that suggests we are in the sixth mass extinction.

You can use your textbook but are encouraged to conduct your own research as well. This is a good opportunity to practice the essay marking criteria in your syllabus guide.

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