1. Consider the structure below:

![Molecule Structure](image)

a) Label all carbons as “up” or “down”.

b) Label all substituents as axial or equatorial.

c) Perform a chair flip on the molecule.

d) Which chair structure is more stable and why?

e) Which conformation will be present at a higher concentration at equilibrium?

2. Label each molecule as cis or trans. Then draw a second conformation and determine which one will be at a higher concentration at equilibrium.

![Molecule Structure](image)
3. Draw 2 isomers for the 1,3-diflorocycloheptane

4. Match the term to the definition:

<table>
<thead>
<tr>
<th>Enantiomer</th>
<th>Chiral</th>
<th>Identical</th>
<th>Diastereomers</th>
<th>Constitutional Isomers</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) 2 molecules that are superimposable mirror images of each other</td>
<td>b) 2 molecules that are non-superimposable mirror images of each other</td>
<td>c) 2 molecules that have the same molecular formula, but different connectivity</td>
<td>d) A molecule that has at least 1 stereocenter and is non superimposable onto its mirror image</td>
<td>e) Stereoisomers that are not mirror images of each other</td>
</tr>
</tbody>
</table>

5. Determine if the following molecules are constitutional isomers or stereoisomers. Give a 1 sentence explanation for why.

a) 

b)
6. Draw the mirror image of the following compounds. Are they chiral or achiral? Why?

a) ![Chemical Structure]

b) ![Chemical Structure]