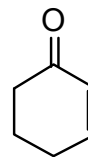


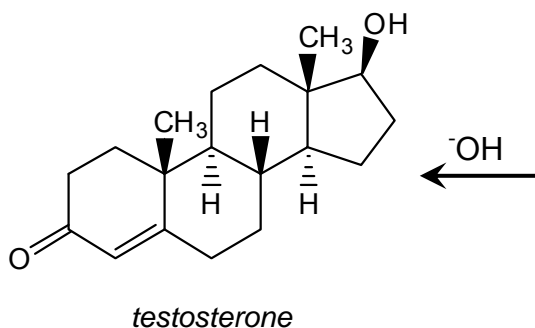
**In-Class Exercise:
The Robinson Annulation in Steroid Synthesis**

The Robinson annulation is used to construct α,β -unsaturated cyclohexenones. Historically, one of the major synthetic applications of the Robinson annulation was the synthesis of steroids, which frequently contain cyclohexenone fragments.

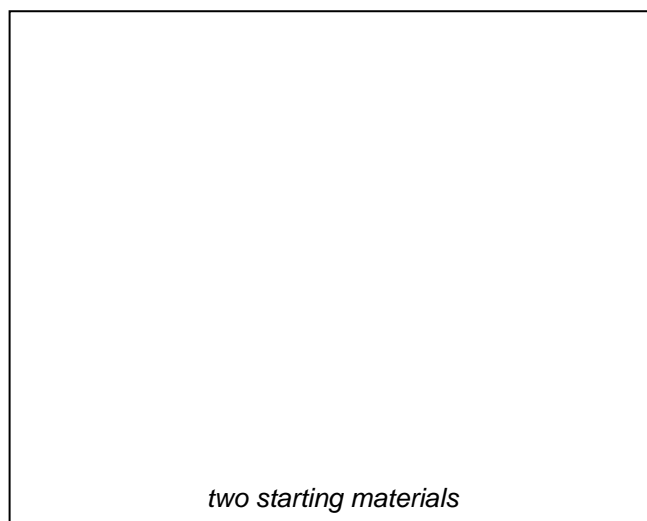


*an α,β -unsaturated
cyclohexenone*

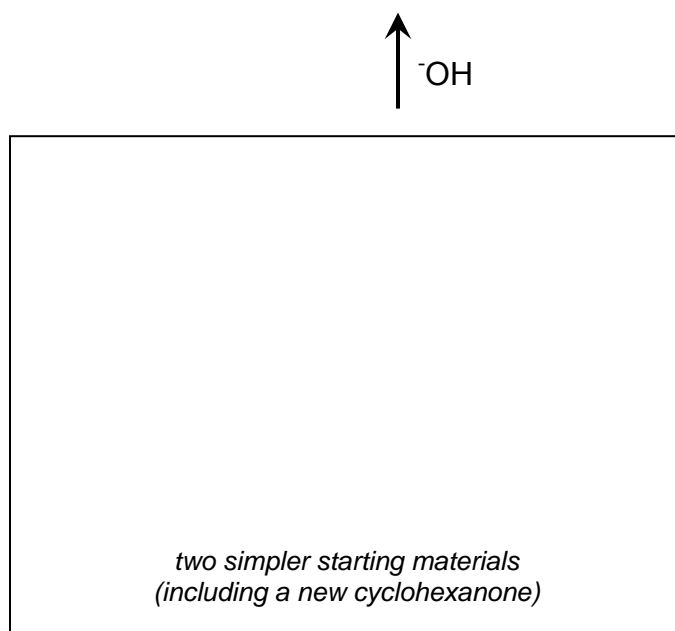
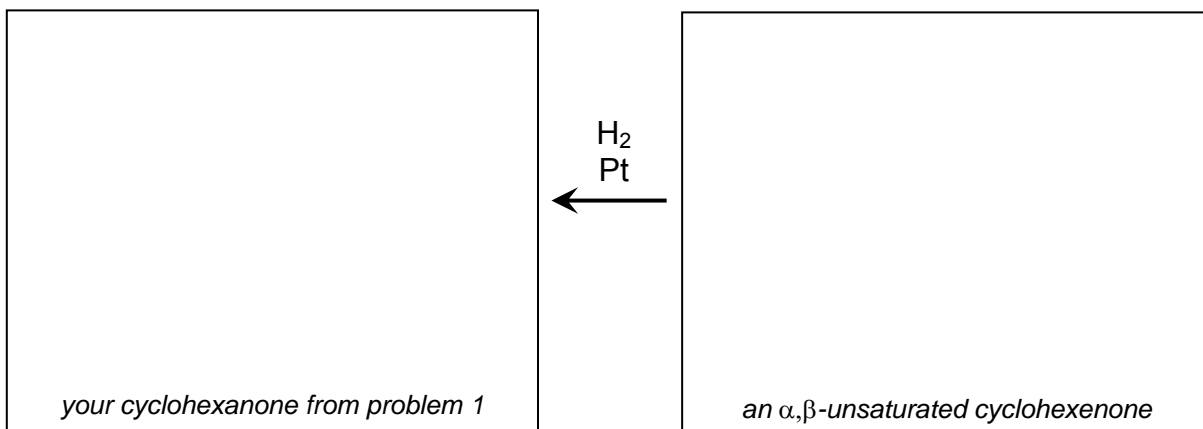
1. Show how testosterone could be synthesized from smaller fragments using a Robinson annulation. Think retrosynthetically—what bonds in the product can you disconnect to get to simpler starting materials?



testosterone



2. One of your starting materials above should be a cyclohexanone (without a double bond). In principle, this could be synthesized by hydrogenation of an α,β -unsaturated cyclohexenone, which could be once again synthesized by Robinson annulation. On the next page, show this series of synthetic disconnections.



3. And you could do the same disconnection one more time.

