Propose a stepwise mechanism for the following reactions:
12.62 A carbocation is resonance stabilized when it is adjacent to an oxygen atom:

![Resonance stabilized carbocation](image)

Such a carbocation is even more stable than a tertiary carbocation. Using this information, propose a mechanism for the following transformation exhibited by a diol. This reaction is called a pinacol rearrangement:

![Pinacol rearrangement](image)
Propose an effective Synthesis for the following transformations: