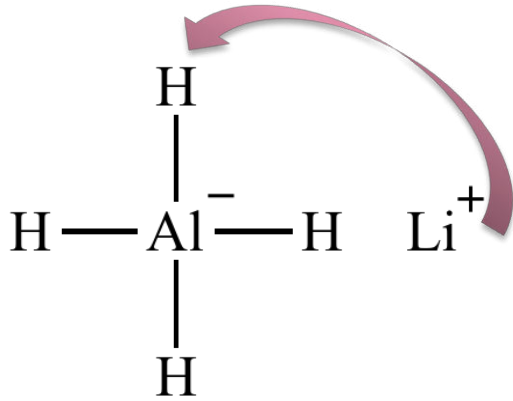


# METAL HYDRIDE REDUCTION

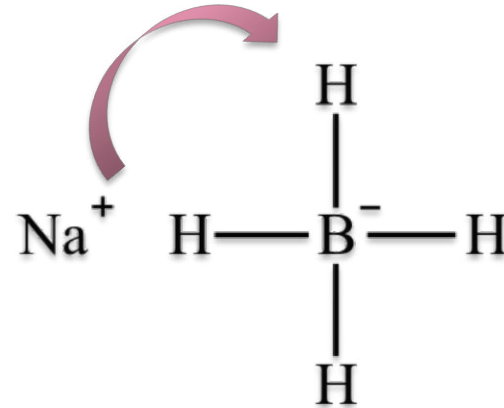
## *DEPTH OF BIOLOGY*

- Reduction means removal of oxygen or addition of hydrogen
- In this reaction, aldehyde / ketone is reduced in the presence of  $\text{LiAlH}_4$  /  $\text{NaBH}_4$  and  $\text{H}_2\text{O}$  / ethanol
- $\text{LiAlH}_4$  &  $\text{NaBH}_4$  serve as source of  $\text{H}^-$  [hydride]
- $\text{LiAlH}_4$  reacts better with  $\text{H}_2\text{O}$
- $\text{NaBH}_4$  reacts better with ethanol

# DEPTH OF BIOLOGY



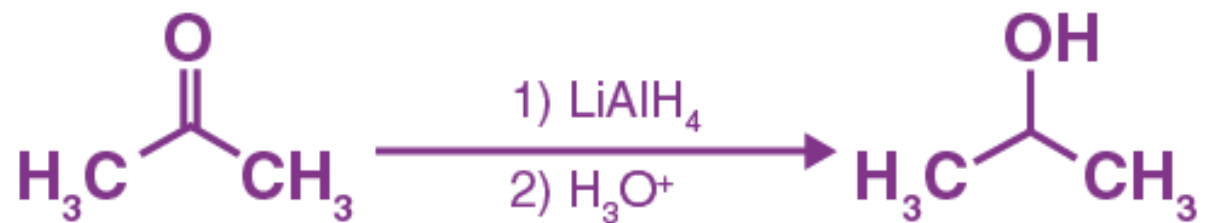
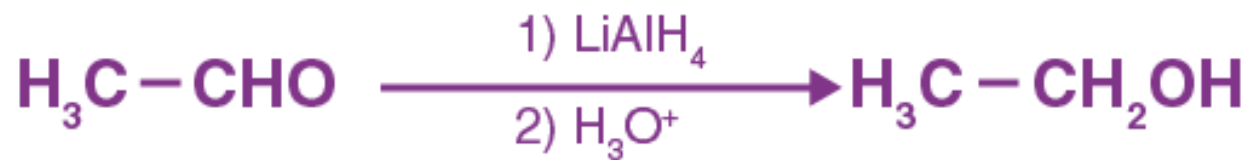
Li<sup>+</sup> will be attracted to Al<sup>-</sup> and hence one Hydrogen atom will be replaced



Na<sup>+</sup> will be attracted to B<sup>-</sup> and hence one Hydrogen atom will be replaced

# DEPTH OF BIOLOGY

## $\text{LiAlH}_4$ Reduction of carbonyl compounds



## DEPTH OF BIOLOGY

- Since oxygen is electronegative element , bond breaks and a  $-Ve$  charge is created on O while a  $+Ve$  charge develops on C
- To maintain the  $+ve$  charge of C, hydride ion [released from  $LiAlH_4$  ] attached to it
- Then the reaction progresses under the action of  $H_2O$
- $H_2O$  dissociates into  $H^+$  and  $OH^-$ .  $H^+$  binds to  $O^-$  while  $OH^-$  combines with  $Li^+$  and forms  $LiOH$

# DEPTH OF BIOLOGY

