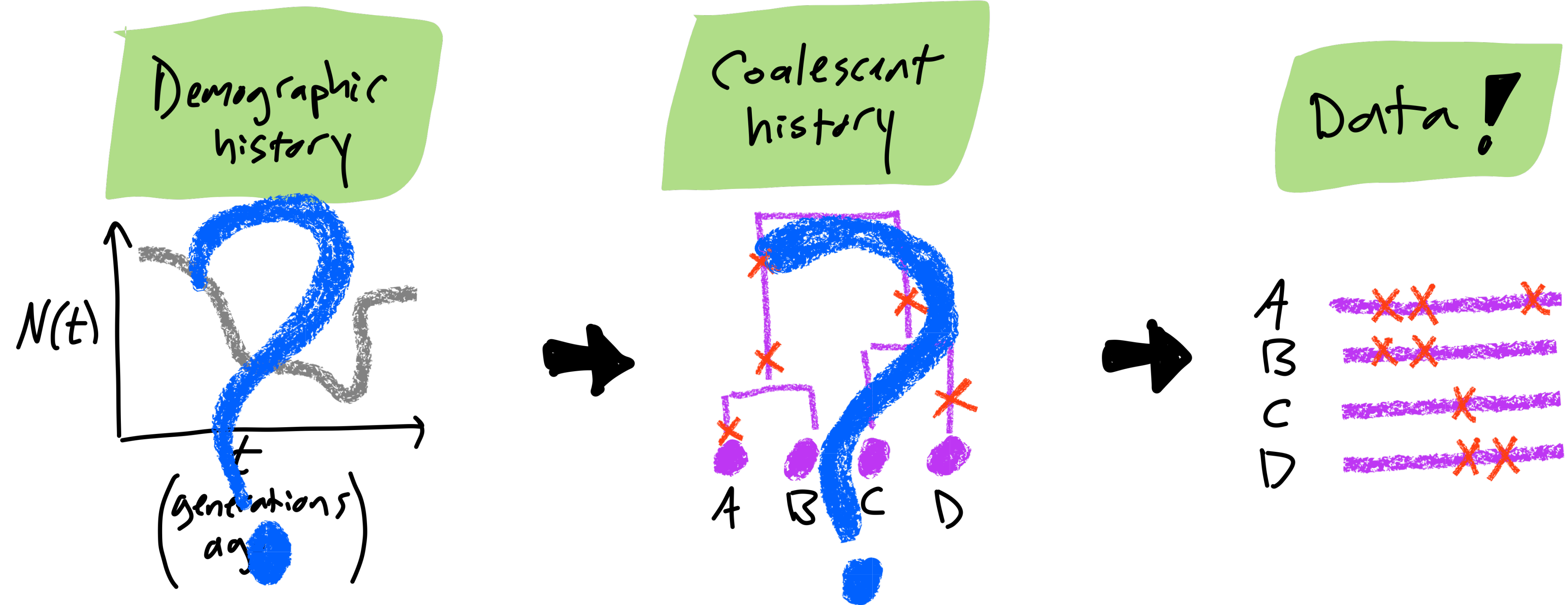


Coalescent theory

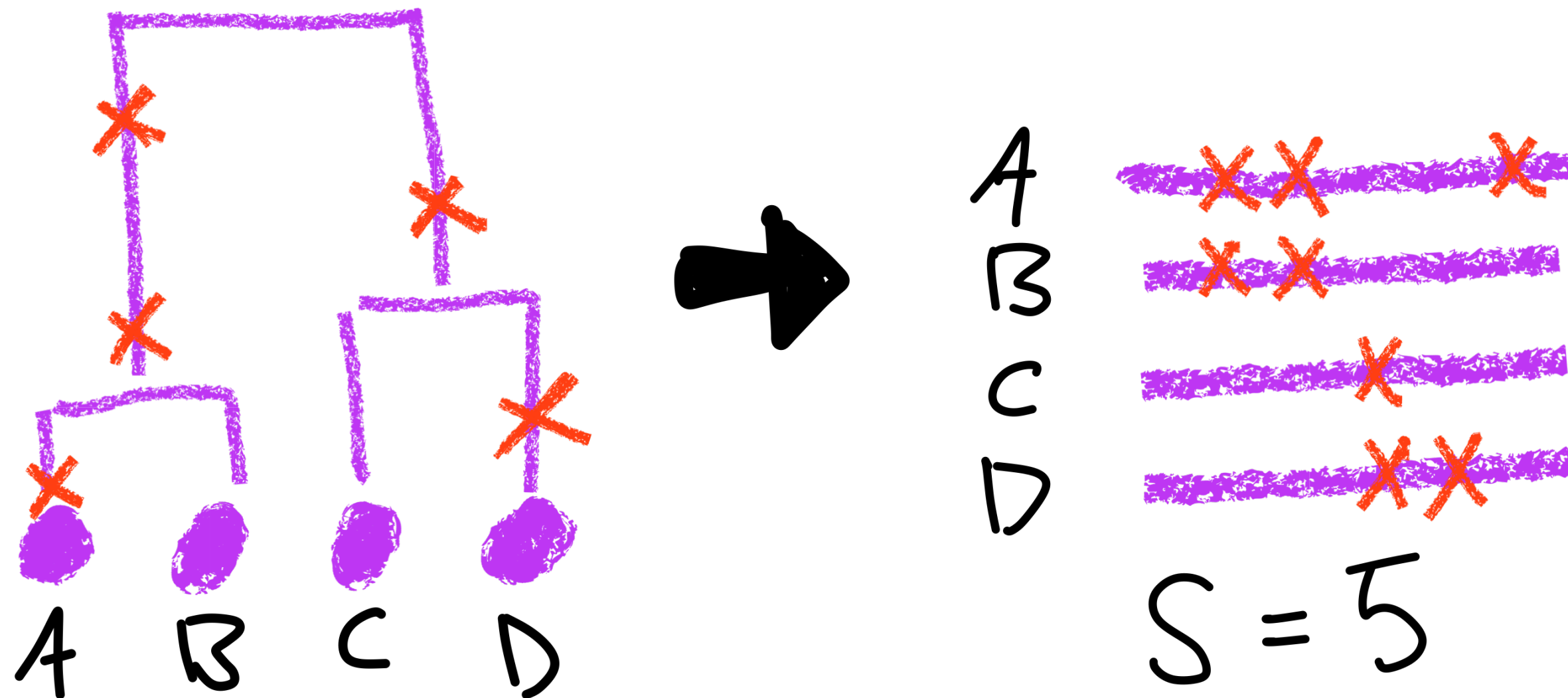
Genetic diversity



Coalescent theory

Genetic diversity

segregating sites, S , equals # mutations in the sample's history (infinite sites approximation)



Constant N case :

$$\begin{aligned} E[S] &= \mu E[T_{\text{total}}] \\ &= \mu \sum_{i=2}^n i E[T_i] \\ &= \mu \sum_{i=2}^n i \frac{2N}{\binom{n}{2}} \\ &= 4\mu N \sum_{i=1}^{n-1} \frac{1}{i} \end{aligned}$$

total branch length