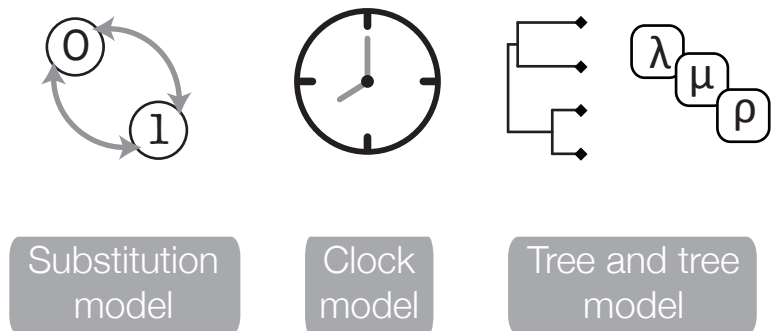


## Tripartite model components



## Bayes theorem

$$\begin{array}{c}
 \text{likelihood} \quad \quad \quad \text{priors} \\
 \downarrow \quad \quad \quad \downarrow \\
 P(\text{data} \mid \text{model}) P(\text{model}) \\
 \hline
 P(\text{data}) \\
 \uparrow \\
 \text{marginal likelihood of the data}
 \end{array}$$

$P(\text{model} \mid \text{data}) =$

↑
posterior

## Putting everything together

posterior

↓

$$P(\text{tree, fossil ages, model parameters} \mid \text{data}) =$$

likelihood of the data  
given the model

↓

probability of the timetree  
given the tree model

↓

priors on  
fossil ages

↓

priors on model parameters

↓

$$\frac{
 P(\text{data} \mid \text{tree, fossil ages, model parameters})
 P(\text{tree} \mid \text{fossil ages})
 P(\text{fossil ages})
 P(\text{model parameters})
 P(\text{tree})
 P(\text{model parameters})
 }{
 P(\text{data})
 }$$

↑
marginal likelihood of the data