- Genotype frequencies and allele frequencies remain constant over time

Population: $f(G_1G_1) = p^2$, $f(G_1G_2) = 2pq$, $f(G_2G_2) = q^2$

↓ Random Matings

(parents)

$f(G_1) = p$ ? $\quad f(G_2) = q$ ?

$G_1$ $\quad$ $G_2$

$1^{st}$ generation

| | $f(G_1) = p$ $G_1$ | $f(G_2) = q$ $G_2$ |
|---|---|---|
| $f(G_1) = p$ $G_1$ | $f(G_1G_1) = p^2$ | $f(G_1G_2) = pq$ |
| $f(G_2) = q$ $G_2$ | $f(G_2G_1) = q \cdot p$ | $f(G_2G_2) = q^2$ |

$$f(G_1) = f(G_1G_1) + \frac{1}{2} f(G_1G_2)$$

$$= p^2 + \frac{1}{2} \cdot 2 \cdot p \cdot q = p^2 + p \cdot q$$

$$= p(\underbrace{p+q}_{=1}) = p$$

$$f(G_2) = f(G_2G_2) + \frac{1}{2} f(G_1G_2)$$

$$= q^2 + p \cdot q = q(q+p) = q$$