(g) For a fixed x, the chunk of string under consideration exhibits SIMPLE HARMONIC MOTION in the y-direction.

Therefore, we can define an EFFECTIVE SPRING CONSTANT k_{eff}, as for a point particle attached to a spring (SHO):

$$k_{eff} = m_{ch} \cdot \omega^2 = \left(\frac{dx}{L}\right) m\omega^2 \quad (5g)$$

We see that $k_{eff} \propto m\omega^2$, a combination that appears in the expressions for all the forces (5c) — (5e).