Diffusion: how will particles spread in time & space?

There are two key equations to know:

$$J_{N_k} = -D_k \frac{\partial n_k}{\partial x} \qquad \text{Fick's law}$$

and: $$D_k = \frac{k_B T}{\gamma_k} \qquad \text{Stokes-Einstein relation}$$

The first equation tells us that the change in particles across an area with respect to time (J_{N_k}) is proportional to the gradient of particles in space ($\partial n_k / \partial x$), i.e. the concentration gradient.

The second equation tells us that the proportionality constant, D_k, is inversely related to the coeff. of friction γ_k