

## Brownian Motion Interactive



### Background History and Scientific Significance

#### Brownian Motion

In 1827, while examining grains of pollen suspended in water under a microscope, Robert Brown, an English botanist, observed minute particles ejected from the pollen grains, executing a continuous jittery motion. He then observed the same motion in particles of inorganic matter, enabling him to rule out the hypothesis that the effect was life-related. Although Brown did not provide a theory to explain the motion, the phenomenon is now known as **Brownian Motion**.

#### Einstein forms Theory based Brownian Motion

Einstein was the first to properly interpret the significance of Brownian motion. First, he formulated a diffusion equation for Brownian particles, in which the diffusion coefficient is related to the mean square displacement of a Brownian particle, and secondly he related the diffusion coefficient to measurable physical quantities. In this way, Einstein was able to determine both the size of an atom, and how many atoms there are in a mole, or their molecular weight in grams. More importantly, Einstein finally put to rest the idea that matter was continuous as many scientists of his time still believed.

#### Brownian Motion Interactive

Visitors control the agitation of steel balls, which represent atoms. The steel balls continuously bombard a puck, which represents a minute particle, in a random fashion causing the puck to mimic the “jittery” motion Robert Brown first observed.