

**SCIENCE
IN THE
SAND**

In addition to their artistic beauty and substantial allure, KB Collection Sandpictures (formerly "Rainbow Vision Sand Pictures") afford first-hand observation of a wide range of scientific principles. Sandpictures comprise **three phases** consisting of a **solid phase** (various sand sized mineral grains such as quartz that have been crushed into sand sized particles, a **liquid phase** (water), and a **gaseous phase** (air bubbles). Because the three phases have different **densities** (mass per volume, weight per size), **gravity** causes sand to fall through air bubbles and water to their final resting places. Because there are between 4 and 7 different densities of solid minerals in our Sandpictures, the sands don't mix. Watch with front and back lights to see different minerals exhibit different **luster** (how minerals reflect light). Because of differences in liquid (water) **viscosity** ('stickiness' or resistance to flow) and solid (mineral) density, the sand grains fall through the water to create a wide variety of features.

The formation of different KB Collection Sandpictures landscapes encompasses many processes in fluid mechanics and sediment transport which are dependent on the **friction** and **stress** between solid (sand) and liquid (water) phases. These interactions are dependent in part on sand grain size, sand grain shape and sand grain density, but also on the viscosity and density of the fluid, and the 'size' of the system determined as the distance between the glass panels which must be the perfect width. All of these factors control the **velocity** (speed) that grains fall, and the **elapsed time** it takes your Sandpicture to complete one cycle of **deposition**. The process of sand accumulating is called **sedimentation**; layers of sand grains have younger layer deposited on top of them creating layers called **stratification**. This is known as the **law of superposition**. When the Sandpicture begins to form, the gaseous air barrier catches some sand grains and releases others, which fall to create sedimentary, mountainous mounds called dunes separated by the v-shaped valleys. As dunes **aggrade** upward and **prograde** outward, they form deltas consisting of inclined **foreset beds** from the deposition of small **landslides** at the **angle of repose** (at this angle, sand slides down the dune slopes).

KB Collection Sandpictures also provide an excellent example of a **stochastic system** in which the outcome (the final landscape in your Sandpictures) is never the same as the one before, even though the physics of the system does not change from cycle to cycle. Perhaps the most interesting feature regarding the KB Collection Sandpictures is whenever a physicist or an astronomer discovers a new star or a galaxy, he then becomes the „creator“ of that new galaxy, because he **detected** something that was not really there before. In our world of sandpictures, this also means that whenever you make a new Sandpicture, you have created a new small universe which has never been there before. Isn't that great?