Exploring Products—
Kinetic Sand

Why does this dry sand seem wet?

NanoDays™
The Biggest Event for the Smallest Science!

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Try this!

1. Play with the sand in both trays. Poke it. Pick it up. Let it fall slowly from your fingers. What happens? What do you notice about these different sands?
2. Use the tools to make small sand sculptures. Do your sculptures hold their shapes? What happens if you leave them alone for a little while? How do the two sands behave differently?

What's going on?

One of the sands (the Kinetic Sand™) has been coated with a thin polymer layer. The polymer layer is so tiny that an individual grain of sand looks and feels just like regular sand, but a container of it behaves very differently! The polymer coating that gives the Kinetic Sand these unique properties is polydimethylsiloxane (PDMS).

The PDMS coating makes the Kinetic Sand behave more like wet sand. You can sculpt and build with it, but over time, Kinetic Sand creations flow apart and the sand moves in some interesting and surprising ways. We think this odd behavior happens because the polymer coating makes the sand stick to itself. So as a grain of sand moves—even a little—it pulls other grains along with it.

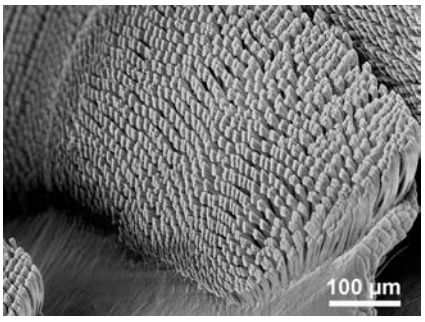
PDMS isn't just used in Kinetic Sand—it's used in many commercial products, including water repellants, lubricating oils, and even anti-gas drops for babies!

How is this nano?

The way a material behaves on the macroscale is affected by its structure on the nanoscale. You can't see or feel the nano-layer of PDMS on the sand because it's so thin, but you can observe that the Kinetic Sand behaves differently from ordinary sand.

Polymers are important in nanoscale research. For example, scientists at the University of Massachusetts Amherst have used PDMS, as well as other soft polymers, to make a material known as Geckskin™.

The amazing, sticky properties of Geckskin were inspired by real geckos in nature. Geckos are able to walk on walls and cling to ceilings because of the tiny nano-sized hairs on their feet. Geckskin mimics these tiny hairs. Geckos must also be able to lift their toes up and put them back down. Strong tendons in their feet allow them to do this. Geckskin also uses strong stiff, fabrics that act as synthetic tendons to pull on the soft polymer.



Gecko toes have tiny nano-sized hairs that allow them to walk on walls and cling to ceilings

Scientists and engineers often try to mimic nature when they're developing new products—we call this *biomimicry*. Biomimicry is especially important in nanotechnology, where engineers are using it to create new electronic displays, drugs, tiny robots, and protective coatings.