

### Health and safety

Magic Sand is quite safe. However, care should be taken to ensure that it is not ingested or inhaled and that it does not come into contact with eyes. Prolonged exposure to skin should be avoided.



### What happens in this experiment?

Magic Sand is regular sand (silicon dioxide:  $\text{SiO}_2$ ) that has been coated with a special nano-coating. This nano-coating is hydrophobic ('water hating'). When Magic Sand is poured onto water it won't mix with the water but will float until the mass of the sand breaks the surface tension of the water, making the sand sink. The Magic Sand in the kit is made by exposing regular sand to vapours of trimethylsilanol ( $\text{CH}_3$ )<sub>3</sub>SiOH.

Nanoscientists are interested in the coatings that make Magic Sand as they are within the nanoscale; that is a size range of 0.1 - 100 nm (that's ten billionths of a metre to ten millionths of a metre!).

## Applications

Magic Sand was originally developed to trap ocean oil spills near the shore. By sprinkling Magic Sand onto floating petroleum, the Magic Sand would mix with the oil and make it heavy enough to sink.

Unfortunately, due to the expense of production it is not currently being used for this purpose. However, since Magic Sand never freezes, utility companies in the Arctic areas have tested it as a foundation for electrical boxes.



## Ideas for conducting the activity or discussion

- Encourage participants to examine the sand in its normal (dry) state - it should appear identical to the sand on a beach (except for its colour!).
- Ask participants to experiment with the sand in water - what shapes can they make?
- Participants should try and think why the sand is behaving in this way.

## Learning objectives or school curriculae

- An understanding of hydrophobic and hydrophilic forces.
- Appreciation that nanotechnology can be used to modify existing substances.

