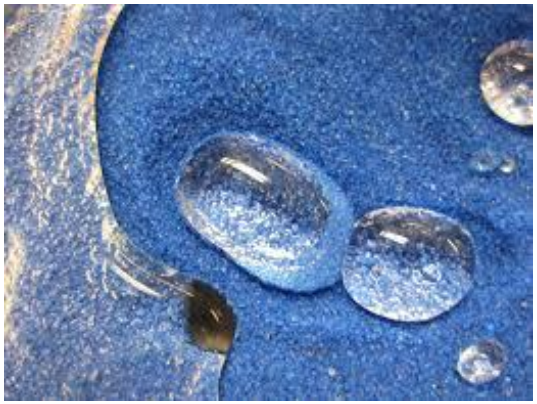
DIY Air Force Activities:

Magic Sand

Materials:

- clean sand (~1-2 cups)
- waterproofing spray (such as Scotchgard)
- any bowl
- pan or cookie sheet
- tin foil



The coatings applied to your cell phone screens and eyeglasses are ultra-thin! They are only nanometers thick (thinner than a strand of hair)! Coatings like this fall under the category of nanotechnology, and change the natural properties of a material. For example, sand is made of a substance called silica. This material is "water-loving," or hydrophilic. It sticks to water. When coated with the waterproofing spray it becomes "water fearing," or hydrophobic. It repels water. Following the instructions below you can do your own coating experiment.

Directions:

1. Line the bowl and the pan with tin foil.
2. Fill your bowl half way with clean sand.
3. Spray liberally with the waterproofing spray until all the sand looks wet and is well coated.
4. Spread the coated sand onto the pan to dry.

Once dried you can begin to experiment with your "magic" waterproof sand! Notice how the structure and shape of the sand shifts and is different once poured into water, and is dry once removed. How does this change when it is poured into another liquid such as oil?

Air Force Associations:

The Air Force Office of Scientific Research (AFOSR) was given a grant to investigate the use of nanomaterials for use in creating shape-shifting structures. These nanomaterials would include organic (carbon based) and inorganic (non-carbon based) materials. The structure of these materials is capable of changing depending on its sensitivity to factors like heat or light. Shape-shifting structures could be used in air craft design, pilot safety equipment, and sensor systems. In addition, coating technology is used for protective and antireflective technologies.