

## Teacher Notes Pages

### To the Teacher:

A nanometer is one billionth ( $1 \times 10^{-9}$ ) of a meter which can be about 3 to 5 atoms in width. It is very difficult for students this age to conceptualize this small measurement. The PowerPoint presentation, [“What is the Meaning of “Nano” in Nanotechnology?”](#), should assist with this need.

**Lab Tips:** Students may need help in determining how many small pretzels to use so you might make that decision for them or get a class consensus. Also, when removing the pretzels from the chocolate dip, students should hold the pretzel over the cup for the same amount of seconds. Students should take special care to have enough chocolate in their cups so that the pretzels can be lowered to the *same distance* on each pretzel. Since students have marked on these pretzels, don't let them eat them!

### Extensions:

Ask students why babies get cold so much quicker than adults....this has to do with the fact that babies have a much large surface area than adults compared to their volumes.

Why do people prefer angel hair pasta over regular-sized pasta? Same concept....they hold more sauce on their surfaces.

Small animals are poisoned more easily by herbicides and pesticides because of their smaller surface to volume ratio.

See the PowerPoint presentation, [“Nanotechnology and Nanofibers”](#) for more examples.

### Websites:

<http://www.nanitenews.com/>

<http://www.ucsd.tv/getsmall/>

<http://electrospun.blogspot.com/>

<http://www.nnin.org/>