Nanotechnology Building Challenge
Instructor Notes

This activity uses the experience of trying to snap together small building blocks while wearing oven mitts to emphasize the idea that technology is currently too large and bulky to easily and quickly manufacture desired objects on the nanoscale. As nanotechnology continues to be refined and improved, we may be able to use atoms and molecules just like toy building blocks, snapping them together easily to create tiny structures and machines. To introduce the Building Challenge activity, you could ask students the smallest thing they can think of, leading into a discussion of atoms and scale.

Tips
Any toy building set with small pieces should work well for this activity. They could be packaged sets or generic pieces to build structures that you specify. Suggested toys are LEGO® or K’NEX®. Lincoln Logs® or even mini-marshmallows and toothpicks could be used. Alternatively, students could build specific molecules using molecular modeling kits. If not enough oven mitts are available, bulky mittens could be used.

Club members should consider submitting a blog post and/or photos about this activity to the ACS ChemClub office for possible publication online. Material can be emailed to HSChemClubs@acs.org. Photo releases must be submitted with all pictures. The release form is available at http://www.acs.org/chemclub, under the Advisors link.

Suggested Answers

1. Compare the two building experiences, with and without the oven mitts.
   It should be fairly difficult and time-consuming to complete much of the building kit while wearing the oven mitts. It should be much easier and faster to build it without the oven mitts.

2. What made step two difficult?
   Wearing the bulky mitts made it much more difficult to pick up and manipulate the small kit pieces.

3. What general guideline would you suggest for tools compared to the objects that will be manipulated? Provide one example of a proper tool for a particular object that follows this guideline.
   Tools should be appropriate in size to the object being manipulated. For example, one would use a small tweezers to remove a small wooden splinter from a person’s skin, rather than a larger ice tongs.
Adapted from “Nanoscale Activity: Nanotechnology Mitten Challenge”
https://mrsec.wisc.edu/Edetc/IPSE/educators/mittenChall.html

(all URLs were accessed September 2012)