

## Self Assembly 21-Tech Bridging Document



### Exhibit Content Focus:

This exhibit focuses on the idea that molecules and atom, under specific conditions, will automatically form into more complex molecules. It can be seen throughout nature – the growth of kids, formation of snowflakes and crystals, etc. This all happens automatically given certain conditions. In order to create large numbers of very small things, the sort of things needed for nanotechnology, scientists are attempting to employ these same techniques: by providing certain materials under certain conditions, a new material will form. On our exhibit, we are moving carbon atoms around to form a sheet of carbon molecules – a **graphene** sheet (the same stuff as the graphite in pencil lead. This same sheet, when rolled upon itself, will form carbon nanotubes (models are hanging from the ceiling).

### Related Apps:

- **Name: The Elements**

- Icon: Xe
- Description: This app is a list of all the elements on the periodic table and gives visual examples, properties, and tells stories about each one.
- Relation to Exhibit Content: Carbon is an element that can be looked up on the app (#6 - the one with the large diamond on it). Point out how carbon can take on many forms – diamonds, graphite in pencils, and even Buckey balls (the one that looks like a stick model of a soccer ball). Buckey Ball models are also on the ceiling and are how Rice University won a Nobel Prize.
- Helpful Hints:

- **Name: Self-Assembly**

- Icon: 
- Description: This app allows you to build particles that, based on their structure and the conditions in which they are placed, will form different patterns.
- Relation to Exhibit Content: While this app doesn't actually create new particles from the ones you made, you can see by changing either the conditions or the molecules, you will form different patterns.
- Helpful Hints: When you open the app, click on the “info” button to learn more about how the app operates. Quick notes: white and white repel, red and white repel, red and red attract. You can create molecules by adding more particles, selecting their color, controlling their size, and the location where they come together. After hitting play, you can increase the temperature (which makes them move faster) and change the overall size of the molecules. You can also use your finger to move the surface to see the various patterns forming.

### Additional Information/Resources:

<http://www.math.udel.edu/MECLAB/Projects/SelfAssembly/selfassembly1.htm>

<http://www.howtoons.com/wp-content/uploads/2010/03/cereal.png>

<http://bradley.bradley.edu/~campbell/demopix6.html>

<http://www.zyvex.com/nanotech/nano4/whitesidesAbstract.html>