Name_____ Period _____ Date _____

Buckyball STEM Sims

**Lesson 5: Why the Purple Color?**

The color of a material that is seen by a person is based on the colors of visible light that are absorbed by the material and those that are reflected. The person sees the colors of light that are reflected. So a red-colored shirt absorbs all of the colors of light except red. Are you ready to become completely absorbed in this investigation?

**Doing the Science**

1. Start the Buckyball Simulation by clicking on the "Sim" tab.
2. Click on the fullerene ($C_{60}$) container and drag a chunk to the empty beaker on the tabletop.
3. Click the "On" button on the *Optical Absorption Spectrum* device. If "No Data" appears, the material does not create a spectrum. If data does appear in the graph area, click the graph area to enlarge the graph for detailed study. Note and record in Table 1 the wavelengths of light that are *not* absorbed by the substance (*reflected*). The wavelengths of light that are not absorbed by the substance appear as valleys in the graph that approach the "0" position of the "UV-VIS Absorption" axis.
4. Click the "X" in the upper right-hand corner of the Graph screen to return to the lab testing area.
5. Click the "Reset" button at the bottom of the screen.
6. Repeat steps 2 – 4, except test the remaining materials and combinations described in Table 1 instead of using fullerene. Make sure to note and record your data in Table 1.

**Table 1. Optical Absorption Spectra**

| Sample | Reflected Wavelengths (nm) |
|---|---|
| (Fullerene) $C_{60}$ | |
| Water | |
| Benzene | |
| Potassium Doping | |
| (Fullerene) $C_{60}$ & Water | |
| (Fullerene) $C_{60}$ & Benzene | |
| (Fullerene) $C_{60}$ & Potassium Doping | |

**Do You Understand?**

1. On the back of this paper, sketch the graph(s) for the materials and/or combinations that displayed absorption spectra. Make sure to properly title and label all graphs and axes.

2. Based on your data and investigation, explain why $C_{60}$ dissolved in benzene has a purple color.