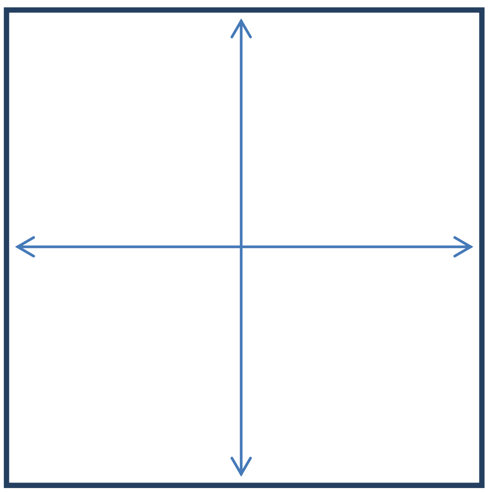
# Electron Addresses

**Problem:** Illustrate a model of the atom that shows the position of electrons while also adhering to the Heisenberg Uncertainty principle.

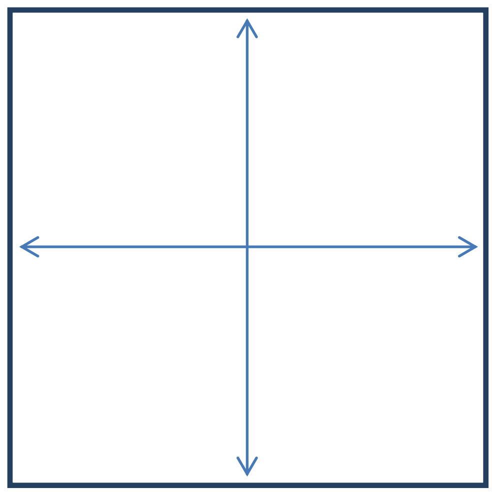
**Procedure:**

1. Open the PowerPoint presentation titled "1s Orbital"
2. The slide show will present a series of snapshot images that show the position of two electrons. These images will remain in the screen briefly and then be replaced by another snapshot taken at a different point in time.
3. As these images are displayed, plot the position of the electrons in the diagram found in the results section of this lab.
4. At the end of the slide show, draw a shape that best predicts the position of the electron at any given time in the 1s orbital.
5. Repeat steps #1-4 with the "2s Orbital," "2px Orbital," "2py Orbital" and "2pz Orbital" PowerPoint files.

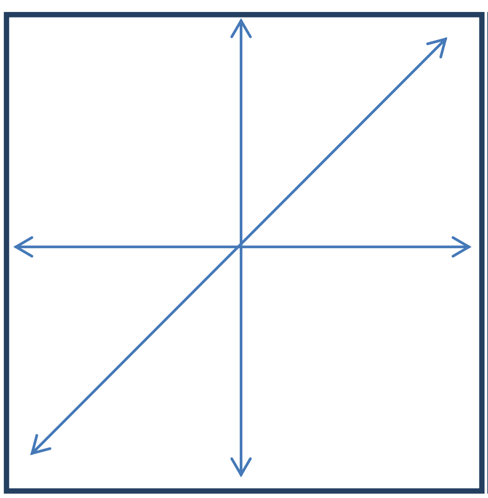
**Results:**



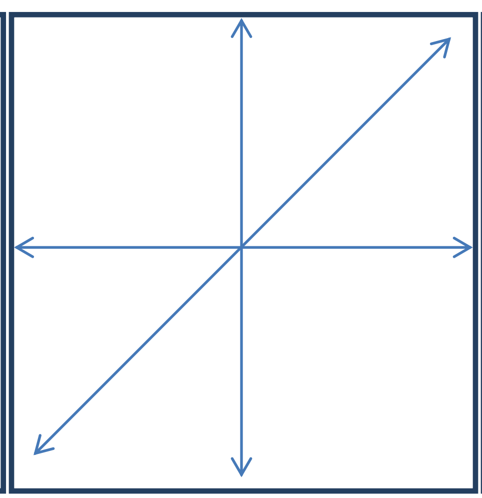
1s Orbital



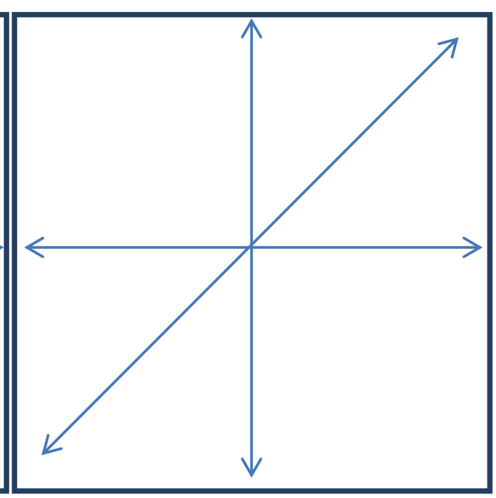
2s Orbital



$2p_x$ Orbital



$2p_y$ Orbital



$2p_z$ Orbital

**Conclusions:**

1. Compare the shapes of the two s orbitals in this activity.

2. Compare the shape of the 3 p orbitals in this activity

3. According to the snapshot images in the PowerPoint, how many electrons were in each orbital?

4. Describe where the electrons are likely to be found in each of the 5 orbitals shown in this lab. Were there ever exceptions to these shapes? If so, explain.

5. Neon has _______ valence electrons in the second energy level. Where would you expect to find each of these electrons based on the orbitals described in this activity?

6. Beryllium has _______ valence electrons in the second energy level. If s orbitals are lower in energy than p orbitals, where would you expect to find each of Magnesium's valence electrons?

7. Oxygen has _______ valence electrons in the second energy level. If electrons fill the p orbitals such that each p orbital will contain one electron before any of the p orbitals will contain a second electron, where would you expect to find each of Oxygen's valence electrons?

8. For each of the examples in questions 5-7, write an "address" for the valence electrons that shows the orbital (1s, 2s, 2px, etc.) and the number of electrons found in that orbital (with a superscript). For example, the "address" of Helium's valence electrons would be $\underline{1s^2}$ showing that Helium has two valence electrons, both of which are in the 1s orbital.