

Name \_\_\_\_\_

Date \_\_\_\_\_

### Electron Configuration

In yesterday's activity, you learned how to fill up an imaginary hotel. Now you will relate this example to electron orbitals. Electron orbitals are modeled by the picture below and are grouped into principal energy levels.

Electrons fill orbitals according to rules similar to the rules in the hotel example:

- Electrons in their ground state assume the configuration that requires the least energy.
- Electrons will not occupy the same orbital, unless the only alternative is moving to a new energy level.
- Only two electrons can occupy a single orbital.
- Electrons in the same orbital move in opposite directions.

The first six orbitals look approximately like this:

3d \_\_\_\_\_ n=3  
 (4s \_\_\_\_\_) n=4  
 3p \_\_\_\_\_ n=3  
 3s \_\_\_\_\_ n=3  
 2p \_\_\_\_\_ n=2  
 2s \_\_\_\_\_ n=2  
 1s \_\_\_\_\_ n=1

Show how you would fill the following orbitals:

(1) 7 electrons

3d \_\_\_\_\_ n=3  
 (4s \_\_\_\_\_) n=4  
 3p \_\_\_\_\_ n=3  
 3s \_\_\_\_\_ n=3  
 2p \_\_\_\_\_ n=2  
 2s \_\_\_\_\_ n=2  
 1s \_\_\_\_\_ n=1

(2) 16 electrons

3d \_\_\_\_\_ n=3  
 (4s \_\_\_\_\_) n=4  
 3p \_\_\_\_\_ n=3  
 3s \_\_\_\_\_ n=3  
 2p \_\_\_\_\_ n=2  
 2s \_\_\_\_\_ n=2  
 1s \_\_\_\_\_ n=1

(3) 10 electrons

3d \_\_\_\_\_ n=3  
(4s \_\_\_\_\_) n=4  
3p \_\_\_\_\_ n=3  
3s \_\_\_\_\_ n=3  
2p \_\_\_\_\_ n=2  
2s \_\_\_\_\_ n=2  
1s \_\_\_\_\_ n=1

(4) 24 electrons

3d \_\_\_\_\_ n=3  
(4s \_\_\_\_\_) n=4  
3p \_\_\_\_\_ n=3  
3s \_\_\_\_\_ n=3  
2p \_\_\_\_\_ n=2  
2s \_\_\_\_\_ n=2  
1s \_\_\_\_\_ n=1

(5) 13 electrons

3d \_\_\_\_\_ n=3  
(4s \_\_\_\_\_) n=4  
3p \_\_\_\_\_ n=3  
3s \_\_\_\_\_ n=3  
2p \_\_\_\_\_ n=2  
2s \_\_\_\_\_ n=2  
1s \_\_\_\_\_ n=1

(6) 3 electrons

3d \_\_\_\_\_ n=3  
(4s \_\_\_\_\_) n=4  
3p \_\_\_\_\_ n=3  
3s \_\_\_\_\_ n=3  
2p \_\_\_\_\_ n=2  
2s \_\_\_\_\_ n=2  
1s \_\_\_\_\_ n=1

(7) 5 electrons

3d \_\_\_\_\_ n=3  
(4s \_\_\_\_\_) n=4  
3p \_\_\_\_\_ n=3  
3s \_\_\_\_\_ n=3  
2p \_\_\_\_\_ n=2  
2s \_\_\_\_\_ n=2  
1s \_\_\_\_\_ n=1

(8) 26 electrons

3d \_\_\_\_\_ n=3  
(4s \_\_\_\_\_) n=4  
3p \_\_\_\_\_ n=3  
3s \_\_\_\_\_ n=3  
2p \_\_\_\_\_ n=2  
2s \_\_\_\_\_ n=2  
1s \_\_\_\_\_ n=1

(9) 22 electrons

3d \_\_\_\_\_ n=3  
(4s \_\_\_\_\_) n=4  
3p \_\_\_\_\_ n=3  
3s \_\_\_\_\_ n=3  
2p \_\_\_\_\_ n=2  
2s \_\_\_\_\_ n=2  
1s \_\_\_\_\_ n=1

(10) 17 electrons

3d \_\_\_\_\_ n=3  
(4s \_\_\_\_\_) n=4  
3p \_\_\_\_\_ n=3  
3s \_\_\_\_\_ n=3  
2p \_\_\_\_\_ n=2  
2s \_\_\_\_\_ n=2  
1s \_\_\_\_\_ n=1