

Atom and electron configuration assignment



**ASSIGN
BUSTER**

As you travel down the periodic table, you add new electron shells that are located rather and further away from the nucleus. This increases the atomic radius. As you travel left to right, you add more protons, but no new shells. The protons pull electron density towards the middle of the atom, decreasing the atomic radius. 8. Test: Hydrogen, lithium, and sodium are all in the same chemical family. Use the Gizmo to find the atomic radius of each, and list them below. Hydrogen radius: 53 pm Lithium radius: 167 pm Sodium radius: 190 pm 9. Analyze: How does the atomic radius change as you go from the top to the bottom of a chemical family?

The atomic radius increases. 10. Challenge: Think about the factors that control atomic radius and the patterns you've seen. A. Why does the atomic radius decrease as electrons are added to a shell? You add more protons but no new shells. The protons pull electron density towards the middle of the atom. B. Why does the atomic radius increase as you go from the top to the bottom of a chemical family? Because you add new electron shells that are located further and further away from the nucleus. 1 1 . Think and discuss: Compare the electron configurations of hydrogen, lithium, and sodium.

Why do you think these elements are grouped in the same family? They all have 1 valence electron on their most outer shell. Activity C: The diagonal rule on the tab, select Ar (argon). Turn on Show number of electrons. Introduction: Beyond argon, it is a bit tricky to determine which subtle gets filled next. There are several rules that scientists use to determine the electron configurations of larger atoms. Question: How are the electron configurations of elements beyond argon determined? 1 . Arrange: Create

the correct electron configuration for argon. Then, click Next element to get to potassium (K).

Click once in the first ad orbital, and then click What feedback is given?

Electrons are not placed in correct energy levels. 2. Rearrange: As it

happens, the as subtle is a lower-energy subtle than ad, so it is filled first.

Remove the electron from the ad orbital and place it in the as orbital. Click

Check. What is the electron configuration for scandium? 1

susup63s23p63d14s2 5. Observe: Scandium is the first element to contain

electrons in the d subtle. How many orbital does the d subtle have, and how

many electrons can fit in the d subtle? The d subtle has 5 orbital and 10

electrons can fit in the subtle. 6. Infer: Select the The middle section of the

table is a chemical family called the transition metals. Why do you think this

section is ten columns wide?

I think this section is 10 columns wide because there are a lot of transition

metals in the chemical family. (Activity C continued on next page)Activity C

(continued from previous page) 7. Make a rule: The diagonal rule explains

which subtle will be filled next. To follow the diagonal rule, move down along

an arrow until you reach the end of the arrow. Then move to the start of the

next arrow to the right. A. Which subtle is filled after up? B. Which subtle is

filled after as? C. Which subtle is filled after ad? _up 8. Practice: Determine

the electron configurations of the following elements. Use the

Now locate the purple lanthanide and actinides on the bottom rows of the

periodic table. A. How many elements are in the in the lanthanide series? 14

B. Which subtle is represented by the lanthanide family? The f subtle is

represented by the lanthanide family C. Which subtle is represented by the actinides family? The f subtle also represents the actinides. D. In general, how is the shape of the periodic table related to electron configurations? (If necessary, continue your answer on another sheet of paper.) The columns are the groups, and they go in the order of the reactivity series.

The elements in the same columns have similar chemical properties. The group the element is in reflects the number of electrons it has on the outer shell. Group one elements are reactive because they only need to gain one electron for a full outer shell, and group eight elements, the noble gases are enervative because they already have a full outer shell and therefore are stable elements. The rows are the increasing atomic masses (left to right), or in other words the order of the elements. Every row starts with an alkaline metal (highly reactive metals) and ends with a noble gas (enervative gases).