Periodic Trends Web Quest and Graphing

**Essential Questions:** How do properties of atoms change across the periodic table?

Go to the following website: [www.rsc.org/periodic-table](http://www.rsc.org/periodic-table) NOTE: For ALL graphs make a **line** graph. The number scale on the Y axis should fill the axis appropriately. Use the symbol for each element on the X axis. The atomic radius is located in the “Atomic data” section for the element.

**Atomic radius:**

1. using the information on the interactive periodic table, fill in the atomic radii for the following elements. You will have to click on each element, then click on atomic data. Use the atomic radius (non-bonded) in Å (angstroms).

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A. Across a period(→):

Atomic Radius

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Element | Atomic Number | Number of Protons | Number of electrons | Atomic Radius |
| Be |  |  |  |  |
| B |  |  |  |  |
| C |  |  |  |  |
| N |  |  |  |  |
| O |  |  |  |  |
| F |  |  |  |  |

Question: What is the trend for atomic radius across a period (→)?

Answer:

Element

B. Down a group(↓):

Atomic Radius

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| --- | --- | --- | --- | --- |
| Element | Atomic Number | Number of Protons | Number of electrons | Atomic Radius |
| H |  |  |  |  |
| Li |  |  |  |  |
| Na |  |  |  |  |
| K |  |  |  |  |
| Rb |  |  |  |  |
| Cs |  |  |  |  |

Question: What is the trend for atomic radius down a group (↓)?

Answer:

Element

**Ionization Energy:**

2. Fill in the 1st ionization energy for the following elements. If you scroll over an element, you will see the 1st ionization energy.

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A. Across a period(→):

1st ionization Energy

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Element | Atomic Number | Number of Protons | Number of electrons | Ionization  Energy |
| Be |  |  |  |  |
| B |  |  |  |  |
| C |  |  |  |  |
| N |  |  |  |  |
| O |  |  |  |  |
| F |  |  |  |  |

Question: What is the trend for 1st ionization energy across a period (→)?

Answer:

Element

B. Down a group(↓):

1st ionization Energy

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| --- | --- | --- | --- | --- |
| Element | Atomic Number | Number of Protons | Number of electrons | Ionization  Energy |
| H |  |  |  |  |
| Li |  |  |  |  |
| Na |  |  |  |  |
| K |  |  |  |  |
| Rb |  |  |  |  |
| Cs |  |  |  |  |

Question: What is the trend for 1st ionization energy down a group (↓)?

Answer:

Element

**Electronegativity:**

3. Fill in the electronegativity for the following elements. You will have to click on the element, scroll down to “Atomic Data” and look for electronegativity (Pauling scale).

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A. Across a period(→):

Electronegativity

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Element | Atomic Number | Number of Protons | Number of electrons | Electro-  negativity |
| Be |  |  |  |  |
| B |  |  |  |  |
| C |  |  |  |  |
| N |  |  |  |  |
| O |  |  |  |  |
| F |  |  |  |  |

Question: What is the trend for electronegativity across a period (→)?

Answer:

Element

Question: What is something unusual or unexpected? Why do you think this is?

Answer:

B. Down a group(↓):

Electronegativity

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| --- | --- | --- | --- | --- |
| Element | Atomic Number | Number of Protons | Number of electrons | Electro-  negativity |
| H |  |  |  |  |
| Li |  |  |  |  |
| Na |  |  |  |  |
| K |  |  |  |  |
| Rb |  |  |  |  |
| Cs |  |  |  |  |

Question: What is the trend for electronegativity down a group (↓)?

Answer:

Element

**Electron Affinity:**

4. Fill in the electron aﬃnity for the following elements. You will have to click on the element, scroll down to “Atomic Data” and look for electron aﬃnity (Pauling scale).

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A. Across a period(→):

Electron Affinity

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| --- | --- | --- | --- | --- |
| Element | Atomic Number | Number of Protons | Number of electrons | Electron  Affinity |
| Be |  |  |  |  |
| B |  |  |  |  |
| C |  |  |  |  |
| N |  |  |  |  |
| O |  |  |  |  |
| F |  |  |  |  |

Question: What is the trend for electron aﬃnity across a period (→)?

Answer:

Element

Question: What is something unusual or unexpected? Why do you think this is?

Answer:

B. Down a group(↓):

Electron Affinity

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| --- | --- | --- | --- | --- |
| Element | Atomic Number | Number of Protons | Number of electrons | Electron  Affinity |
| H |  |  |  |  |
| Li |  |  |  |  |
| Na |  |  |  |  |
| K |  |  |  |  |
| Rb |  |  |  |  |
| Cs |  |  |  |  |

Question: What is the trend for electron aﬃnity down a group (↓)?

Answer:

Element

Conclusion Questions:

1. Define the following terms:
   1. Atomic Radius:
   2. 1st ionization energy:
   3. Electronegativity:
   4. Electron affinity:
2. Atomic Radius: Complete the following

|  |  |  |
| --- | --- | --- |
| Element | # of Protons | Atomic Radius |
| Be |  |  |
| F |  |  |

* 1. Which element has the smaller atomic radius?
  2. Why do you think this element has a smaller radius? (how does the number of protons aﬀect atomic radius?)

1. Ionization Energy: Complete the following:

|  |  |  |
| --- | --- | --- |
| Element | # of Protons | Ionization  Energy |
| He |  |  |
| Kr |  |  |

* 1. Which element has the smaller 1st ionization energy?
  2. Why do you think this element has a smaller 1st ionization energy? (how does atomic radius aﬀect 1st ionization energy?)

1. Electronegativity: Complete the following:

|  |  |  |
| --- | --- | --- |
| Element | # of Protons | Electro-  negativity |
| Ga |  |  |
| Br |  |  |

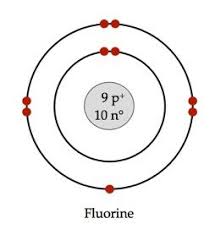
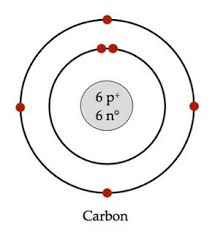
* 1. Which element has the larger electronegativity?
  2. Why do you think this element has a larger electronegativity? (how does # of protons aﬀect electronegativity?)

1. Electron Aﬃnity: Complete the following:

|  |  |  |
| --- | --- | --- |
| Element | # of Protons | Electron  Affinity |
| B |  |  |
| Tl |  |  |

* 1. Which element has the greatest electron aﬃnity?
  2. Why do you think this element has a greater electron aﬃnity? (how does # of electrons aﬀect electron aﬃnity?)

1. Which element will have a smaller atomic radius? Include a claim, with evidence and reasoning.



**C**

**F**

|  |  |  |
| --- | --- | --- |
| Claim: | | |
| Evidence: | Evidence: | Evidence: |
| Reasoning: | Reasoning: | Reasoning: |