Tournament Rules

Here are the rules for predicting the winners in each round of *It's Elementary—March Madness*. In the event of a tie in the properties of two competing elements in any round of the tournament, the element with the larger atomic mass always wins.

- First round: Research the date of discovery of each element. In each bracket, ***the element that was discovered earlier (in its free element form) wins*** and proceeds to the second round. If an element has been known since ancient times, assign it a discovery date of zero.
- Second round: Compare the ionization energy of the elements in each bracket. ***The element with the higher ionization energy is the winner*** and advances to the Sweet 16.
- Third round (Sweet 16): Compare the group numbers of the elements—***the winner is the element with the larger group number using the international (IUPAC) system (Groups 1–18).***
- Fourth round: ***The element with the larger atomic radius wins this round and earns a trip to the Final Four.*** Use the atomic or covalent radius only, not the van der Waals radius.
- Semifinals (Final Four): ***Solve the following riddles to determine the two elements that will compete for the championship.***
  - This "salt-maker" is also a rainmaker when its silver salt is scattered into clouds.
  - Once a sedative and cure for nervous tension, the ion of this element is now a trite or commonplace expression.
- Finals: It's often said that there's no _____ in team, but it is the winner in this field!

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Graphing Periodic Trends

Purpose: Explore and graph the trends for atomic size, ionization energy and electronegativity in the periodic table

Materials: graph paper and colored pencils

Procedure: Use your textbook to look up and graph trends in atomic radius, first ionization energy, and electronegativity for elements 1-36. Be sure to give each graph a title and to label each axis.

1. Graph One: Atomic Radius
   a. For elements 1-36, make a graph of atomic radius as a function of atomic number. Plot atomic number on the X axis and atomic radius on the Y axis. Label each • with the element symbol.

   b. For elements in Group 1 and 2, graph group number vs. atomic radius. Use a different color for each line.

2. Graph Two: Ionization Energy
   a. For elements 1-36, make a graph of first ionization energy as a function of atomic number. Plot the atomic number on the X axis and ionization energy on the Y axis.
   b. For elements in Group 1 and 2, graph group number vs. ionization energy. Use a different color for each line

3. Graph Three: Electronegativity
   a. For elements 1-36, make a graph of electronegativity as a function of atomic number. Plot atomic number on the X axis and electronegativity on the Y-axis.
   b. For elements in Group 1 and 2, graph group number vs. electronegativity. Use a different color for each line.

Analysis: Turn in answers on the back of graph 3.

1. What happens to the atomic radius as the atomic number increases across a period? Down a group?
2. What happens to the ionization energy as the atomic number increases across a period? Down a group?
3. What happens to the electronegativity as the atomic number increases across a period? Down a group?
4. Explain why these trends (atomic radius, ionization energy, and electronegativity) occur.