It's Elementary — March Madness

March Madness is upon us! Your students are probably already working on their next assignment in bracketology, predicting the field for the NCAA Basketball Tournament. (Although the word doesn't appear in Webster's, there is an article on bracketology on Wikipedia, so it must be real.) Let's apply the principles of bracketology to the properties of the elements. The competition among the 64 elements is stiff, and there is a wealth of information for students to research, in this "elementary" version of March Madness!

Review of Element Properties

Define each of the following properties of the elements and briefly describe any periodic trend in the property across a row or down a column in the periodic table.

- Ionization energy
- Atomic radius

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!

NGSS Alignment

This laboratory activity relates to the following Next Generation Science Standards (2013):

Disciplinary Core Ideas: Middle School
MS-PS1 Matter and Its Interactions
PS1.A: Structure and Properties of Matter

Disciplinary Core Ideas: High School
HS-PS1 Matter and Its Interactions
PS1.A: Structure and Properties of Matter

Science and Engineering Practices
Asking questions and defining problems
Analyzing and interpreting data

Crosscutting Concepts
Patterns
Structure and function

References

John Emsley, *Nature's Building Blocks*, Oxford University Press: Oxford England (2001).
WebElements™ Periodic Table, http://www.webelements.com (accessed February 2008).
Flinn Scientific Periodic Table of the Elements, Catalog No. AP9020.

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