

The Periodic Table -- A Simulation



INTRODUCTION

Dmitri Ivanovich Mendeleev, A Russian scientist, was able to organize the elements into a system based upon first grouping the known elements by similar properties and then ranking by increasing atomic weights. The first part of this activity illustrates the ideas of grouping versus ranking by using playing cards.

For the second part of this activity, you will become a scientist in the year 1869. The known elements are written out on cards with properties of each element. The goal is to group the cards by oxygen combination properties and then rank the cards by increasing atomic weight. The final steps will be to expand the table into the periodic table.

Mendeleev was very bold for his time. His periodic table was such that he could predict elements not yet discovered and give properties of those elements based on the position of the missing element in the periodic table.

Task 1: Ranking and Grouping

Jacks count as 11, Queens as 12 and Kings as 13.

1. Group the cards by suit... three stacks.
2. Rank the cards within each suit... three stacks with the lowest card on top.
3. Rank the stacks so the top card goes low to high (left to right).
4. Expand the ranked groups into a table maintaining the ranked order within the groups and between the groups. That is, each column should go from low to high. Each row should go from low to high.
5. Write your results in the table to the right.
6. Can you predict the missing card? _____

Task 2: Development of the Mendeleev Periodic Table.

1. Group the elemental cards by oxygen combination. Note 2:3 is not the same as 3:2.
2. Rank the cards by atomic weight, smallest element on top of each stack.
3. Rank the **stacks** of cards from smallest atomic weight on the left to the largest on the right.
4. Expand the ranked groups into a table maintaining the rank order within the groups and between the groups.
5. Write your results in the table below. What do the gaps represent?

Task 3: Changing Mendeleev's Table into the Modern Table.

1. Paste the cards down on a piece of construction paper.
2. Based on the "transition property" listed on each card, lightly color the elements that belong in a separate family. Double check your choices using a modern periodic table.