Name:_____

ALIEN PERIODIC TABLE

PURPOSE: To gain insight into the development of Mendeleev's periodic table.

DIRECTIONS: Cut out each individual card. For each section, arrange the twenty-six (26) cards as indicated below and answer the questions. DO NOT THROW OUT THE TWO (2) BLANK CARDS.

CARD LAYOUT:

Symbol
Number
Letter
Color
Roman Numeral

α
4
A
Red
I

PROCEDURE/RESULTS:

I. Group the cards by roman numeral.
   a. Do the colors match for each roman numeral? _____ If not, which ones do not? _____
   b. Are there eight (8) of each roman numeral? _____ If not, which ones do not? _____
   c. Is this an adequate system of classification? _____

II. Group the cards by color.
   a. Do the roman numerals match for each color group? _____ If not, which ones do not? _____
   b. Are there four (4) of each color? _____ If not, which ones do not? _____
   c. Is this an adequate system of classification? _____

III. Group in numeric order using rows of seven.
   a. Are there four (4) groups of seven (7)? _____ If not, which ones do not? _____
   b. Do the colors all line up in columns? _____ If not, which ones do not? _____

IV. Whenever possible, try to find some repeating pattern by using numeric order by grouping all the reds, oranges, etc. in columns using only four (4) rows.
   a. Do all of the colors line up when placing them in numeric order? _____ If not, which ones do not? _____
   b. Are there any gaps in the chart? _____ If so, where? _____ _____

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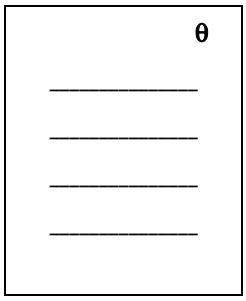
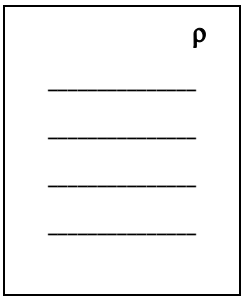
V. Change card "Δβ" and "Δα" so the colors and roman numerals line up.

a. Do the cards still follow a pattern of increasing number? _____ If not, which ones do not? _____

b. Could these numbers be wrong or inaccurately calculated? _____

VI. You should notice that cards are now in alphabetical order (A →Z→Aa→Bb). Place the two (2) blank cards in the empty spaces in your chart. Predict the number, letter, color, and roman numeral for each of the cards below.





Conclusions:

1. In step VI, did the numbers always increase as you move through the chart? _____

2. Mendeleev had a similar problem. He developed the periodic table in the very same manner that you organized this chart. He organized his table using increasing atomic mass, but noticed that some of the properties (color/roman numeral) did not line up in the appropriate columns. Mendeleev speculated that these masses were not accurately calculated and switched them on his chart so the properties would line up in columns. Look at the periodic table on your conversion sheet and list the seven groups of elements that Mendeleev would not have organized by increasing atomic mass.

1. _____ & _____
2. _____ & _____
3. _____ & _____
4. _____ & _____
5. _____ & _____
6. _____ & _____
7. _____ & _____

3. Mendeleev also found gaps in his periodic table and predicted undiscovered elements and their properties using the column properties & trends. Using the properties of the cards in step Vi, predict the colors and roman numerals as you move across the row.

Color: _____ _____ _____ _____ _____ _____ _____

Roman Numeral: _____ _____ _____ _____ _____ _____ _____

4. Mendeleev's hypothesis that the atomic masses calculated incorrectly was proven wrong. But fortunately Henry Moseley rectified Mendeleev's problem. Moseley had calculated the number of protons in the nucleus of various atoms and found that Mendeleev's periodic properties fell right into place when the elements were arranged by increasing atomic number. This discovery led to our modern periodic table. This was very similar to arranging the cards in alphabetical order. In step VI, did all of the colors/roman numerals line up in columns? _____