

Purpose: To better understand the thinking process of Dmitri Mendeleev when he was making the first real periodic table.

Safety: For this lab it cannot be overstated how easy it will be to become frustrated and totally annoyed with both the lab process and the teacher as well.

Please promise not to curse, cry, freak out, or throw the puzzle pieces around.

I promise, signed: _____.

This is what you need to do: working with one friend, count your cards UPSIDE DOWN. You should have 22 cards, all with the same number on the back. Each puzzle is slightly different from the others (they all appear similar). I have removed 2 cards at random from each set, the missing cards are important.

What set number do you have? _____

Once you finish that, turn the cards over and try to put all 22 cards onto a flat surface. You must arrange your cards into a rectangle shape (with room for the 2 missing cards). All of the 6 properties below must make sense going down each "group" and across each "period". Once you manage that, you will be able to figure out exactly what your two missing cards look like: the color, number of holes, number of stars, number of notches, the whole number and the decimal number, exactly. You'll bring this page to the front of the room, tell me WHAT SET you have, and tell me about your two missing cards. If you are correct 6 times, I give you the card to finish your puzzle.

Everyone will finish, I will give you enough hints, but NO HINTS before 45 minutes pass.

Each puzzle only fits together in only one way. When the 22 cards are in order, WRITE these down the properties of the two missing cards in the spaces below

Imagine how hard it was for Mendeleev! He didn't know what properties of the elements were important to put together (you do). He didn't know what properties to overlook (you do, none!). He didn't know if any elements were missing, or how many (you do). He didn't know the shape his table would take (you do). You will enjoy this, as he did. who had no idea of the shape of the table, the number of atoms in the table, or what properties were important enough to group together, and which were the ones to overlook!

	Properties of all cards	Missing card #1 Properties	Missing Card #2 Properties
1	Color		
2	Holes/no holes		
3	Notches/no notches		
4	Stars/no stars		
5	Whole numbers		
6	Decimal numbers		

Questions - Do These On Loose Leaf Paper

Mendeleev predicted an element that he felt was missing on his table, just below where he put aluminum. He called it "eka-aluminum" because it predicted that had properties similar to aluminum. He calculated that this undiscovered element could have atomic mass of 68.00 amu, and density of 6.00 g/cm³. When combining with oxygen it should combine as Ea₂O₃. The element he predicted was later named gallium.

1. Compare its actual atomic mass using all the SF from the periodic table, to this prediction to calculate his percent error. Write the formula.
2. Compare the predicted density of gallium to the actual density by doing percent error. Write out the formula, do the math with all of SF on table S.
3. Write out the chemical formula for gallium oxide.
4. Write out the chemical formula for gallium chloride
5. List the symbols of all of the alkali metals
6. List the symbols of all of the alkaline earth metals
7. List the names and the symbols of the first four halogens
8. There are 22 named nonmetals. List their symbols - in order of increasing atomic number, starting with number 1!
9. List the symbols of the noble gases
10. List the symbols and names of the 7 metalloids. What 2 elements touch the staircase but are exceptions to this trend?
11. What GROUP and PERIODS are the inner transitional metals in?
12. State in neat handwriting the Periodic Law.

This Lab	INCLUDES	points
cover	Title and intro	1 + 2
Page 1	The dozen questions above	12
Page 2	Extended conclusion: not specifically about the puzzle. Detail <u>all</u> you know about the periodic table, all of the trends that you examined in class, some of the exceptions to these trends, define allotrope.	10
	Total points:	25