

Periodic Table Puzzle

Name: \_\_\_\_\_

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

Safety: For this class, it cannot be overstated how easy it will be to become frustrated and totally annoyed with both the puzzle and the teacher. Please promise not to curse, cry, or throw the pieces around.

This is what you need to do: working with one friend, count your cards. You should have 22 cards, all with the same number on the back. Each puzzle is slightly different from the others (even though they all appear similar). I have removed two cards at random from each of the puzzle sets, which is important.

Once you count, turn the cards face up, and try to put all 22 cards into a rectangular shape table (leaving room for the two missing cards), where all six of the properties listed below make sense going down each “group” and across each “period”. If you manage this, you will be able to figure out the exact six properties of the two missing cards and fill them in below. Bring this sheet up to the front of the room to see if you got all of the properties perfectly. If you do, you get the card.

Everyone will finish, I will give you enough hints, but you get no hints before next period.

Each puzzle only fits together in only one way. When all of the 22 cards are in order, WRITE the six properties of the two missing cards in the space below

Imagine how hard it was for Mendeleev! He didn’t know what properties of the elements were important to put together (you know here it’s all six). 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: 2 of them). He didn’t know the shape his table would take (you do: it’s a perfect rectangle). You will enjoy this, as he did. (maybe not but you will not forget it either!)

GRADING: 30 points: 6 total points for below, plus 24 points for the 12 questions on the back.

NEW: You will be allowed to write ONE question on the board after 20 minutes. No answers, but the questions from other students might help you think differently about your puzzle. Will it help?

DUE ON: \_\_\_\_\_

I used set # \_\_\_\_\_

	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		

Dimitri Mendeleev predicted an element that he felt was missing on his table underneath aluminum, above indium.

He called it "Eka-aluminum" because he felt it had properties similar to aluminum.

He determined that this undiscovered element should have atomic mass of 68.00 amu, and density of 6.00 g/cm<sup>3</sup>. He also predicted that when combining with oxygen it should combine as Ea<sub>2</sub>O<sub>3</sub>

1. The missing element he predicted was later named gallium. What was his Percent Error for his atomic mass estimation?  
Use all of the decimal places in the element box 31 for AV.

2. Then compare his predicted density of eka-aluminum to gallium to the actual density using percent error.

3. Write the chemical formula for gallium oxide →

Write the chemical formula for gallium chloride →

4. List the symbols of all six of the alkali metals

5. List the symbols the six alkaline earth metals.

6. List the names and the symbols of the first four halogens

7. There are 22 nonmetals. List ALL of these symbols - in order of increasing atomic number.

8. List the symbols of the six noble gases

9. List the symbols & names of the seven metalloids

10. What GROUP are the inner transitional metals in? →

What PERIODS are the inner transitional metals in? →