# 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 appear similar at first glance. Two cards have been removed from each pack, which is important.

Turn the cards face up, and put all 22 cards into a rectangular shape table, leaving room for the two missing cards. Once in order, all six of the card properties will make sense going down each "group" and across each "period". They will exhibit trends. 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 have got all the properties perfectly. If you do, you get the card to put into your puzzle.

Everyone will finish, I will give you enough hints, but you get no hints during the first period. Each puzzle fits together in only one way. When you are sure that all the 22 cards are in order, WRITE the six properties of the two missing cards in the boxes below and meet me in the front of the room to see if you did or not.

Imagine how hard it was for Mendeleev! He didn't know what properties of the elements were important to put together (you know that 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). He didn't know the shape his table would take (you do: it's a perfect rectangle). You will enjoy this, as he did. You may not enjoy this, 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.

| 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 would have properties similar to aluminum.

He estimated that this undiscovered element should have atomic mass of 68.00 amu, and density of 6.00 $g/cm^3$.

He also predicted that when combining with oxygen it should combine as $Ea_2O_3$

Eka-Aluminum turned out to be gallium. What was Mendeleev's percent error for atomic mass? Use the actual atomic mass of gallium for the AV. Use 68.00 amu as your MV. Write a formula first!

What was Mendeleev's percent error for the density of eka-Aluminum? Use his estimate of 6.00 $g/cm^3$ as the MV and the density of gallium as the AV. Write a formula first!

| Write the formula for gallium oxide | Write the formula for gallium chloride |
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| 4. List the symbols for all the alkali metals | | | | | | |
| 5. List the symbols for all the alkaline earth metals. | | | | | | |
| 6. List the names and the symbols of the four halogens | | | | | | |

| 7. List the symbols of ALL the nonmetals, in order of atomic number (use pencil). Therea are too many boxes. | | | | | | | |
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| 8. List the symbols of the six noble gases | | | | | | |
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| 9. List the symbols and the names of all 7 metalloids ☺ | | | |
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| What GROUPS are the inner transitional metals in? | What PERIODS are the inner transitional metals in? |
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