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

Class: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**2.2 – Periodic Table**

**Elements: The Building Blocks of Matter**

* Matter can have a lot of \_\_\_\_\_\_\_\_\_\_\_\_, but all of it can be broken down into the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_​
  + \_\_\_\_\_\_\_ elements occur \_\_\_\_\_\_\_\_\_\_\_\_\_\_ on Earth​
* Ex: oxygen, gold, sulfur, carbon​
* Other elements are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (ie: human-made)



Figure 1. Solid sulfur, one of the elements that occur naturally on Earth. What are some of the properties or compounds of sulfur you know?

**Element Names & Symbols**

* Every element has a unique \_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_​
* Symbols of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ elements are \_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_ letters long​
* First letter is always \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and any other letters are always \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_​
* Can be named for:​
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (ex: Hydrogen)​
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(ex: Sodium)​
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Tungsten)​
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (ex: Californium)​
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (ex: Curium)​
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (ex: Promethium)​

​

**Organization of the Elements**

* By the mid-19th century, almost \_\_\_\_\_\_\_ elements had been discovered​
* Scientists wanted to organize by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, but weren't sure how​
* 1860s --> some tried to sort by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_​
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ --> Russian teacher and chemist wrote data cards for each element known at the time​
* Wanted to see \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in various properties​



Figure 2. Dmitri Mendeleev, the father of the modern periodic table. What did some attempts at organizing the elements other than Mendeleev’s look like?

**Mendeleev’s Predictive Powers**

* Mendeleev recognized patterns in elemental \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_​
* Recognized that he needed to leave \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_​
* Accurately predicted the properties of elements that would be later discovered (ex: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)​

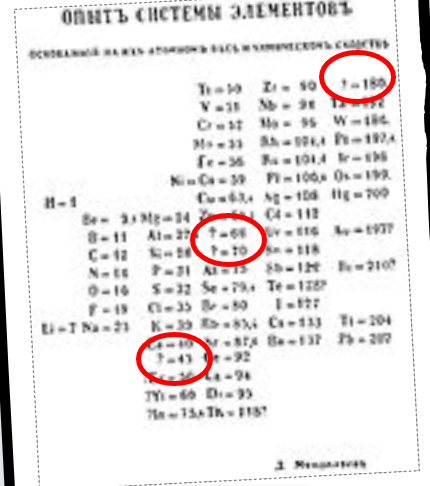
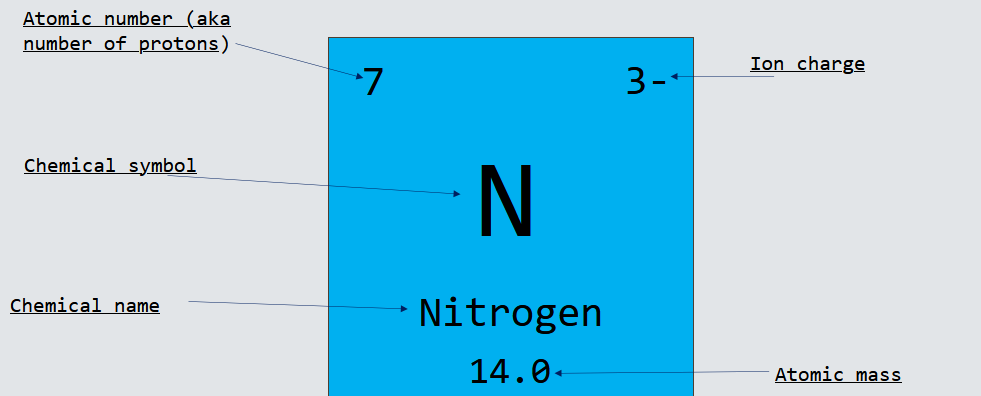
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Figure 3. Data written by Mendeleev. What elements represented by question marks in his notes are now known to us?

**Modern Periodic Table**

Figure 4. Breakdown of nitrogen on the periodic table. What are five things you can tell about nitrogen from this picture?

**Periodic Table Organization**

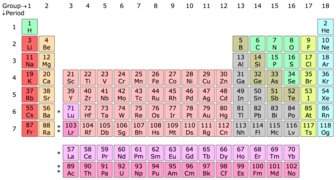


Figure 5. Periodic Table.

* Period = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_​
  + ​elements in same period don't share many \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Group (aka \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_) = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_​
  + elements in same family share many \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Metals**

* Most elements are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_​
* Found on left side of periodic table​
* Metal means:​
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_​
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_​
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_​
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_​
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_​
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_​

**Common Metal Groups**

Alkali Metals:​

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ column of periodic table (excluding \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)​
* Shiny​
* Soft​
* Extremely \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ --> must be stored under \_\_\_\_\_\_\_\_\_\_\_\_\_\_ to avoid reacting with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and oxygen in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_​



Alkaline Earth Metals:​

\_\_\_\_\_\_\_\_\_\_\_\_\_\_ column of periodic table​

Also shiny and soft, but not as much as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Also\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, but not as much as alkali metals​

​



Transition Metals:​

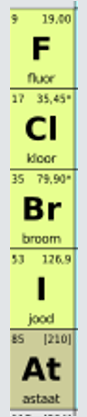
Have many of the common qualities as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_​

Much less \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ than alkali metals and alkaline earth metals​

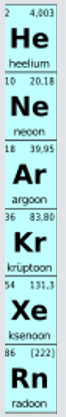
**Non-Metals**

* Found on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_of periodic table**​**
* Also includes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_​
  + Over \_\_\_\_\_\_\_\_\_\_\_\_\_\_ of atoms in the universe are hydrogen​
* Typically \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ solids​
* Poor \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of heat and electricity​
* Not \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_​

**Common Nonmetal Groups**



Halogens:​

* \_\_\_\_\_\_\_\_\_\_ column on periodic table​
* Extremely \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_​
* Most are \_\_\_\_\_\_\_\_\_\_\_ at room temperature​
* Exception: \_\_\_\_\_\_\_\_\_\_ --> \_\_\_\_\_\_\_\_\_\_\_\_

Noble Gases:​

* \_\_\_\_\_\_\_\_\_ group on periodic table​
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_​
* Least \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of all elements​
* ​

**Semi-Metals**

* Aka \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_​
* Boron, silicon, germanium, arsenic, antimony, & tellurium​
* In-between --> have some properties of \_\_\_\_\_\_\_\_\_\_\_\_\_\_ & some of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_​
* Metal properties --> \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_​
* Nonmetal properties --> poor \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, not \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_​

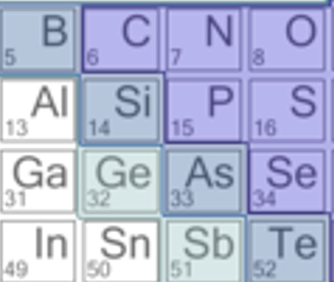
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Figure 6. Semi-metals are B, Si, Ge, As, Sb, and Te.