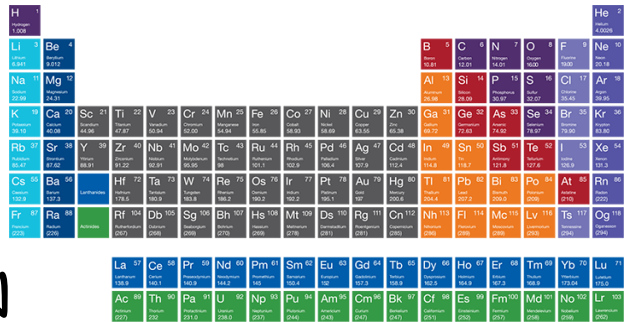


Warm Up

In your own words, what are the four principles of particle theory?

The Periodic Table

Each of the symbols in the periodic table refer to an element. A "chemical symbol" is an abbreviation of the name of an element.



Example: Oxygen - O
Nitrogen - N
Carbon - C

When the periodic table was being created, scientists had to choose a language that would not change.

They chose Latin as a language because it is considered to be a "dead language."

Example: Mercury



Hg ---> Hydraryum (means "liquid silver")

Some elements have 1 letter, others have two.

Example: B, O, N, Mg, Na, Cl

Elements are always given a capital letter at the beginning and a lower case letter after that (if an element with two letters)

Elements Practice Handout

Remember that each element is made of one kind of atom. If we want to write that we have more than one atom of the same elements we write it a certain way.



Here we have TWO atoms of Oxygen



And here we have FOUR atoms of Carbon

Always place these numbers in the bottom right-hand corner

When we start to combine elements, we get compounds! Remember that each element begins with a capital letter.

Ex: NaCl



Counting atoms

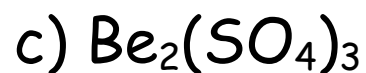
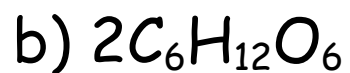
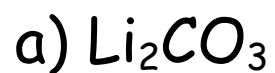
Practice – For each, write out
how many of each element:

- | | |
|-------------------------------------|--|
| 1. KOH | 2. Hg(OH) |
| 3. FeCl ₃ | 4. NH ₄ OH |
| 5. CCl ₄ | 6. Pb(OH) ₂ |
| 7. NH ₄ NO ₃ | 8. Al ₂ (SO ₄) ₃ |
| 9. Li ₂ O | 10. Na ₂ SO ₃ |
| 11. 2H ₂ | 12. 2NaCl |
| 13. 6H ₂ O | 14. 3C ₂ H ₆ |
| 15. 2Al ₂ O ₃ | 16. 4AgNO ₃ |
| 17. 2Ga(OH) ₃ | 18. 3Pb(NO ₃) ₂ |

Counting Atoms Worksheets 1 and 2

Warm Up

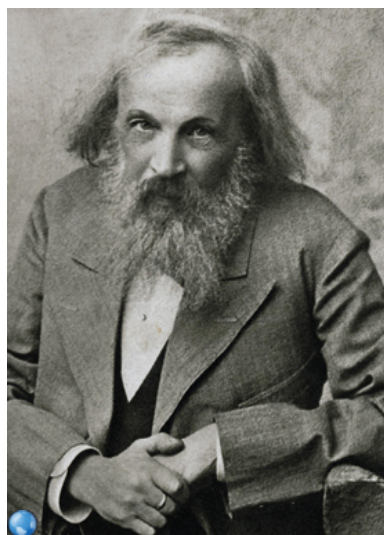
How many atoms of each element are present in the following examples



The History of the Periodic Table

The periodic table is organized in a very precise way... can you see how?

It has only been organized like this since the 1860's. Before that nobody could figure out how it was done.



Dmitri Mendeleev

His law states "If the elements are arranged according to their atomic mass, a pattern can be seen in which similar properties occur regularly."

This is how we know that more elements are still to be discovered!!

The Periodic Table

THE PERIODIC TABLE

- Groups elements with similar properties.
 - Ex. Metals are on the left and in the center of the table. Nonmetals are on the right of the table, above the "staircase".
 - **Metalloids** are located on both sides of the "staircase".
- Properties:

Metals	Nonmetals	<i>Metalloids</i>
Shiny	Dull	<i>*Have properties of both metals and nonmetals.</i>
Malleable	Brittle	
Conductors	Insulators	<i>*Located above and below the staircase that divides metals and nonmetals</i>
React with acid	Do not react with acid	
Mostly solids	Solids, liquids, and gases	

The Periodic Table represents elements in such a way as to highlight their similarities and differences.

INSTRUCTIONS

Explore the Periodic Table below by clicking on the elements.

You can use the '- Select Element -' drop-down menu to quickly jump straight to an element. More information can be found out about periods (rows) and groups (columns) by clicking on the relevant button along the left-hand side or along the top of the table.

There is also a game you can play to test your knowledge.

The interface shows a periodic table with the following layout:

- Top Navigation:** Groups I, II, III, IV, V, VI, VII, VIII.
- Periods:** Period 1 to Period 7.
- Elements:** H, Li, Be, B, C, N, O, F, Ne, Na, Mg, Al, Si, P, S, Cl, Ar, K, Ca, Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, Ge, As, Se, Br, Kr, Rb, Sr, Y, Zr, Nb, Mo, Tc, Ru, Rh, Pd, Ag, Cd, In, Sn, Sb, Te, I, Xe, Cs, Ba, La, Hf, Ta, W, Re, Os, Ir, Pt, Au, Hg, Tl, Pb, Bi, Po, At, Rn, Fr, Ra, Ac.
- Transition Metals:** A label above the d-block elements (Sc to Zn).
- Bottom Navigation:** Metals, Non-metals, - Select Element - (dropdown), Instructions, Find the Elements, Unlock the Code.
- Additional Elements:** A separate row of elements below the main table: Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Th, Pa, U, Np, Pu, Am, Cm, Bk, Cf, Es, Fm, Md, No, Lr.

COLUMNS OF ELEMENTS

- Called chemical **groups** OR Chemical **families**
- Elements that are in the same column of the periodic table.
- Similar physical and chemical properties.
- Form similar kinds of compounds when they combine with other elements.
- Behavior can be explained by the number of electrons in the valence shell of their Bohr diagram: they have the same number of valence electrons!!
 - Hence, they will tend to lose or gain the same number of valence electrons.
- Important groups of the periodic table:

Name of Group	Group Number	Properties
Alkali Metals	Group 1	> shiny, silvery metals. > All have ONE valence electron! > Found in nature only as compounds because they are extremely reactive!
Alkaline Earth Metals	Group 2	> shiny, silvery metals. > All have TWO valence electron!
Halogens	Group 17	> At room temperature, chlorine (Cl) and fluorine (F) are gases, bromine (Br) is a liquid, and iodine (I) is a solid. > Almost always found in nature as compounds because they are extremely reactive (the most reactive nonmetals)! > All have SEVEN valence electron!
Noble Gases	Group 18	> All gases at room temperature. > All have a FULL valence shell (EIGHT valence electrons)! > The full valence shell makes them very stable ("happy"), therefore they do not react with other elements (very inert!).

- Hydrogen is very unique...
 - In some situations it will behave like a metal, while in other situations it will behave like a nonmetal.
 - It has one valence electron.
 - Almost all of Earth's hydrogen exists in combination with other elements because it is very reactive.

ROWS OF ELEMENTS

- The horizontal rows of elements are called chemical periods.
- Elements in the same period show similarities and gradual changes in properties.
- As you move LEFT to RIGHT in a period of elements...
 - The atomic mass of each element increases.
 - The atomic number of each element increases.
 - The elements gradually change from metallic to nonmetallic.
 - *There are more changes, but this is all you need to know in grade 9!*

Test your familiarity with the common 32 elements on the periodic table.

Quizlet

[https://quizlet.com/430889/match?
i=1fk9l2&x=1Kqt](https://quizlet.com/430889/match?i=1fk9l2&x=1Kqt)

Try the "Match" and "Gravity" games to see how well you do!