Atoms and Elements

EMG Education

An is any substance made of only one type of atom.

- For example:

Carbon is an element made of only carbon atoms.

Copper is an element made of only copper atoms.

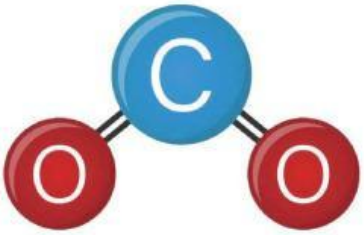
Helium is an element made of only helium atoms.

LIVEWORKSHEETS

Compounds

A is a substance formed when two or more chemical elements are chemically bonded together.

- The elements in compounds are always present in fixed ratios.
- Compounds can be broken down into the elements that make them, but only using chemical reactions.



CO_2 is <u>always</u> 1 carbon:2 oxygen

Examples: H_2O (water), CH_4 (methane), NaCl (salt), $C_6H_{12}O_6$ (glucose/sugar).

EMG Education

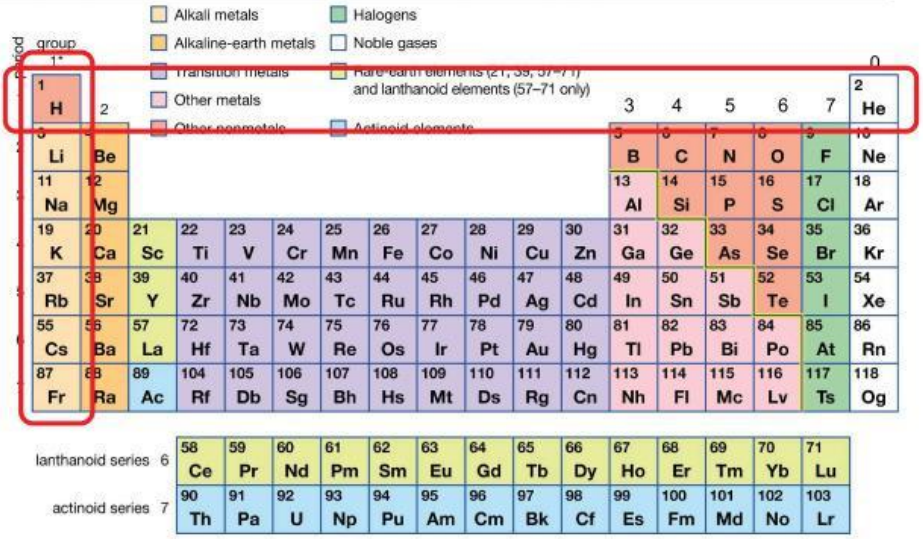
LIVEWORKSHEETS

The Periodic Table

EMG Education

The periodic table is organised by horizontal rows, and vertical columns.

- The horizontal rows are called .
- The vertical columns are called .



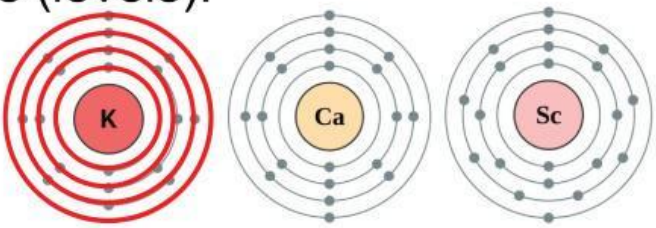
LIVEWORKSHEETS

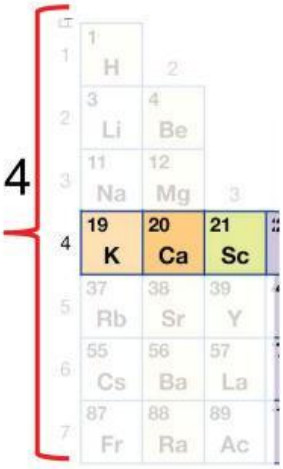
Periods

EMG Education

The horizontal rows are called .

- There are 7 periods in the periodic table.
- All the elements in a period share the same number of electron shells (energy levels).
- For example, all of the elements in period 4 have 4 electron shells (levels).





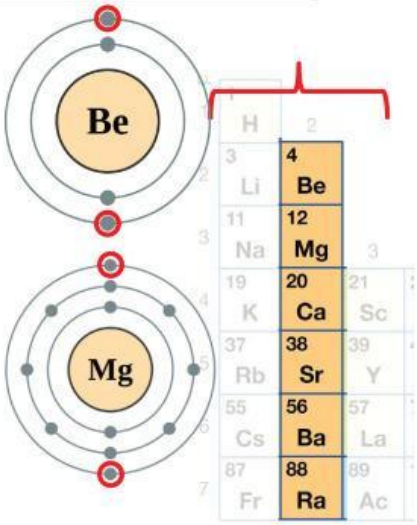
LIVEWORKSHEETS

Groups

EMG Education

The vertical columns are called “ ” (sometimes called families).

- There are 18 groups in the periodic table.
- All elements in a group have the same number of valence electrons (outer electrons).
- For example, all of the elements in group 2 have 2 valence electrons (outer electrons).
- This means the elements in each group share similar chemical and physical properties.

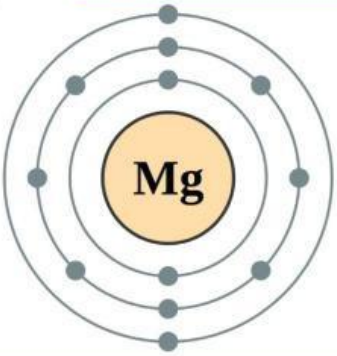


LIVEWORKSHEETS

Shell Models

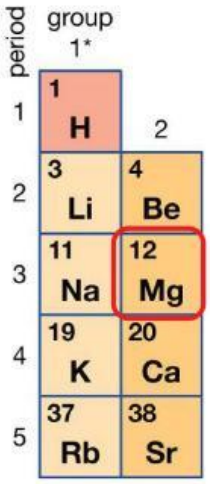
EMG Education

If we know the number of shells and how many valence electrons, we can find which group and period the element is in.



Example: Magnesium

- It has 3 electron shells
- It has 2 valence electrons



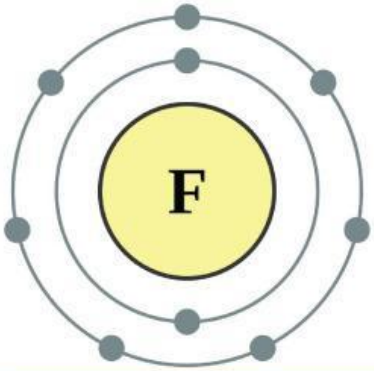
Remember: Valence electrons are the electrons in the outermost shell.

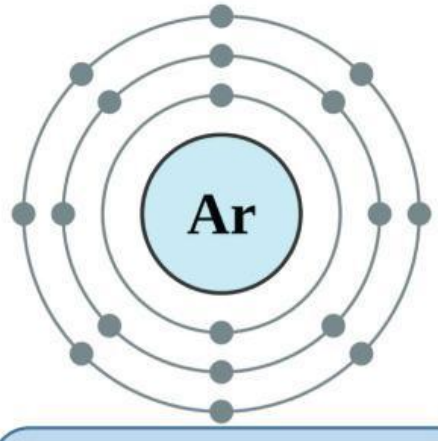
LIVEWORKSHEETS

Shell Models

EMG Education

You try: What is the period and group for these elements?





1 electron shell	2 electron shell	3 electron shell
1 valence electrons	7 valence electrons	8 valence electrons

LIVEWORKSHEETS

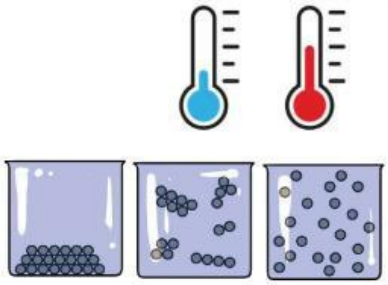
EMG Education

The of an element don't involve changing the chemistry of the element.

- can be observed using our senses and measured numerically.

Examples of physical properties include:

-
-
-
-



LIVEWORKSHEETS

EMG Education

are when there is a change in the structure of the element.

- are only observable during a chemical reaction.
- Elements in the same group have similar

LIVEWORKSHEETS

Respiratory System

The is the group of organs we use for respiration and breathing.

is the process of moving air in and out of the lungs - like when you take a breath. is the reaction, carried out in cells, which produces energy.

EMG Education

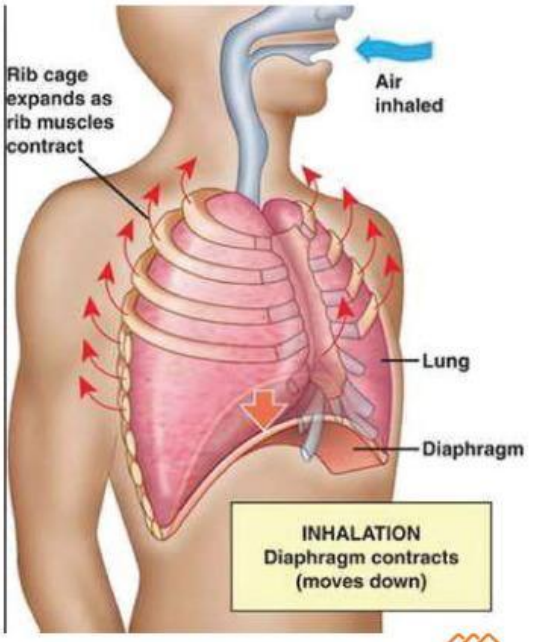
LIVEWORKSHEETS

Breathing in - inhalation

contract pulling the chest walls ***up and out***.

The contracts and moves ***down***.

The increase in size, causing air to rush in from the nose or mouth.



EMG Education

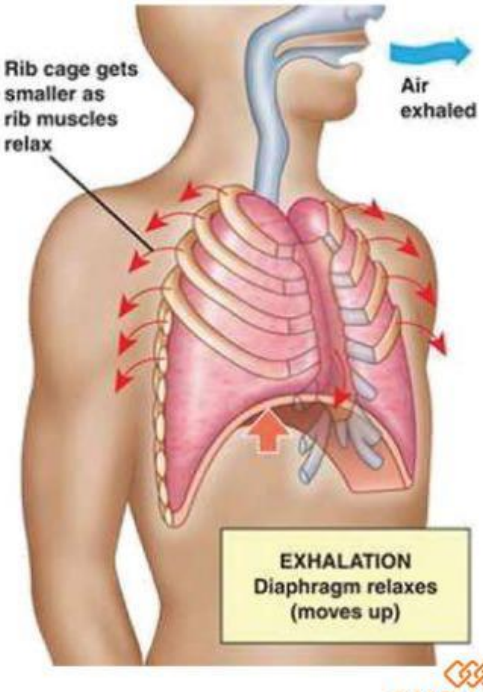
LIVEWORKSHEETS

Breathing out - exhalation

relax, pushing the chest walls ***down and in***.

The muscle relaxes and ***bulges up***.

The decrease in size, so air is pushed out through the nose or mouth.



EMG Education

LIVEWORKSHEETS

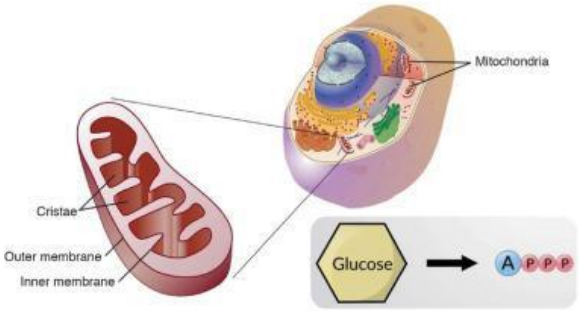
Aerobic Respiration

happens in the mitochondria in plant and animal cells.

use <u>glucose</u> and <u>oxygen</u> to make an energy molecule called <u>ATP</u>.

Water and CO_2 are waste products of cellular respiration.

Don't Copy. Only FYI:
ATP = adenosine triphosphate



EMG Education

LIVEWORKSHEETS

Aerobic Respiration Equation

word equation

glucose + oxygen → carbon dioxide + water + Energy!

balanced chemical equation

$$C_6H_{12}O_6 + 6\ O_2 \rightarrow 6\ CO_2 + 6\ H_2O + \text{Energy!}$$

EMG Education

LIVEWORKSHEETS

21% 0.04% 78% 16% 4% 78%

Gas	Amount in inhaled air	Amount in exhaled air
oxygen		
carbon dioxide		
nitrogen		
water vapour	Variable	

EMG Education

LIVEWORKSHEETS