

The structure of the atom

Today's goals

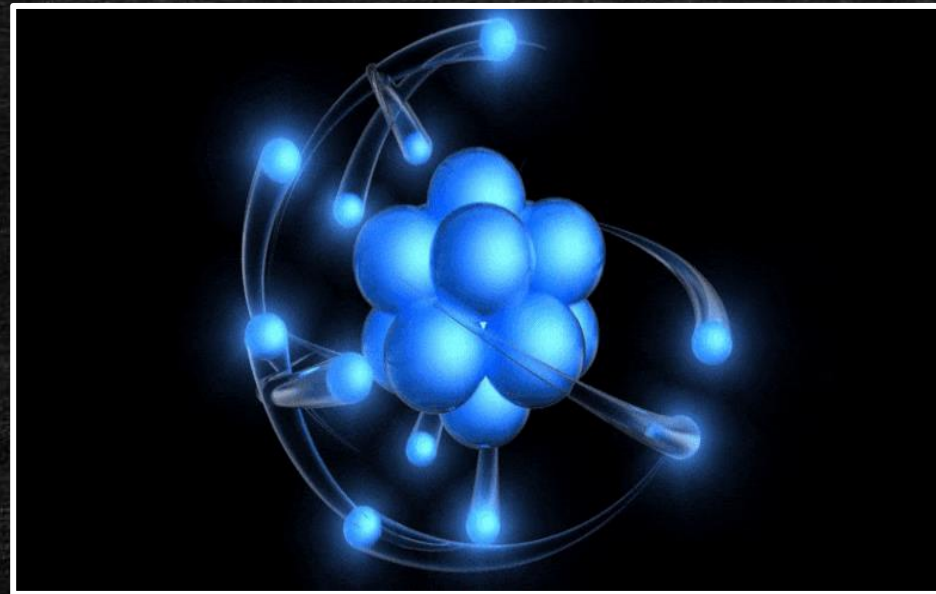
1. Understanding the structure of an atom.
2. Be able to name and describe the three basic elementary particles.
3. Know the difference between atomic number and mass number.
4. Be able to construct a simple atomic model of the basic chemical elements.

Atom

When you hearing the word „atom“,
what is coming to your mind?

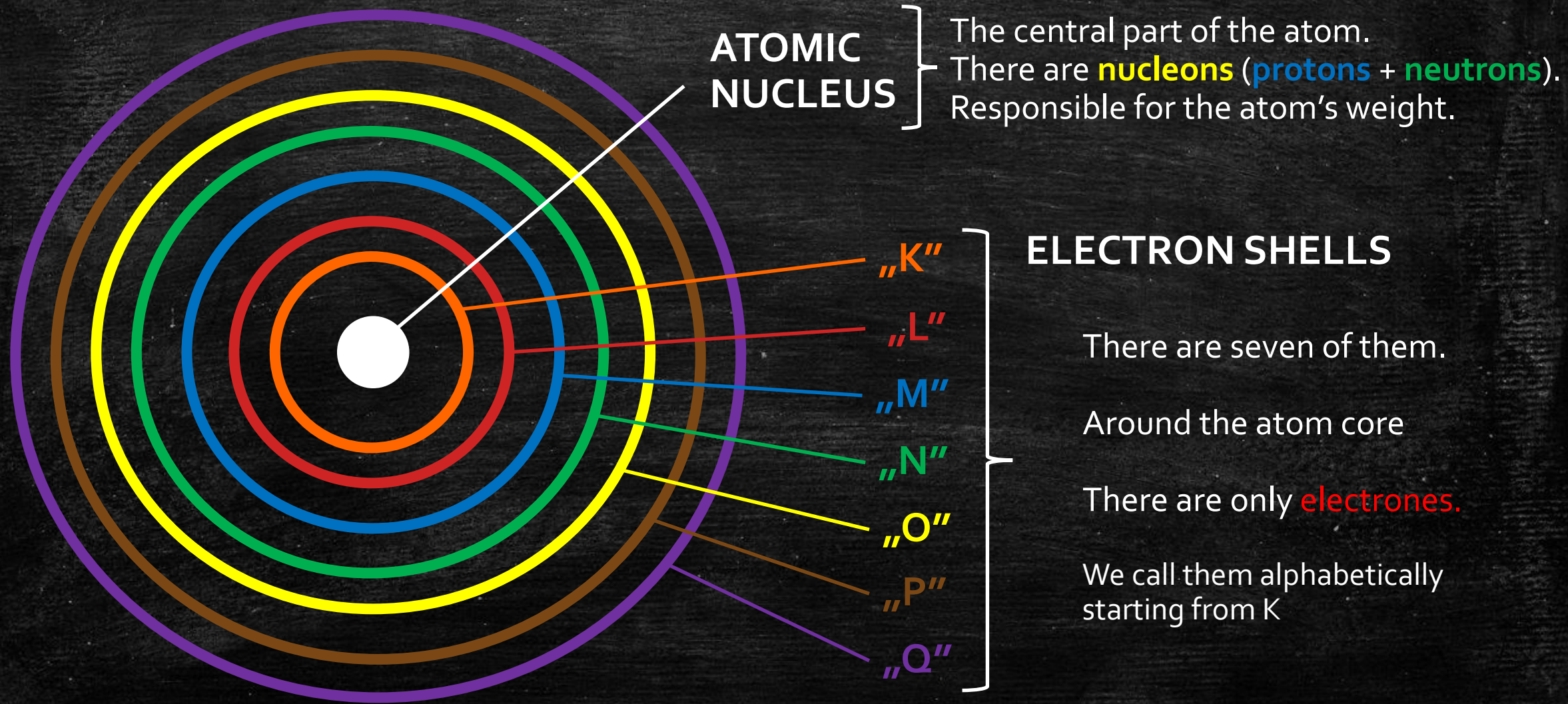
Atom - chemistry

ATOM – is the smallest particle of chemical element that maintains his chemical properties.



Science Made Simple: What Are Atomic Nuclei?
(scitechdaily.com)

Simplified model of the atom structure



Elementary particles

PROTON (p^+) – The fundamental particle of the atomic nucleus that has a **positive charge** ($1+$). The approximate mass of a proton is $1u$.

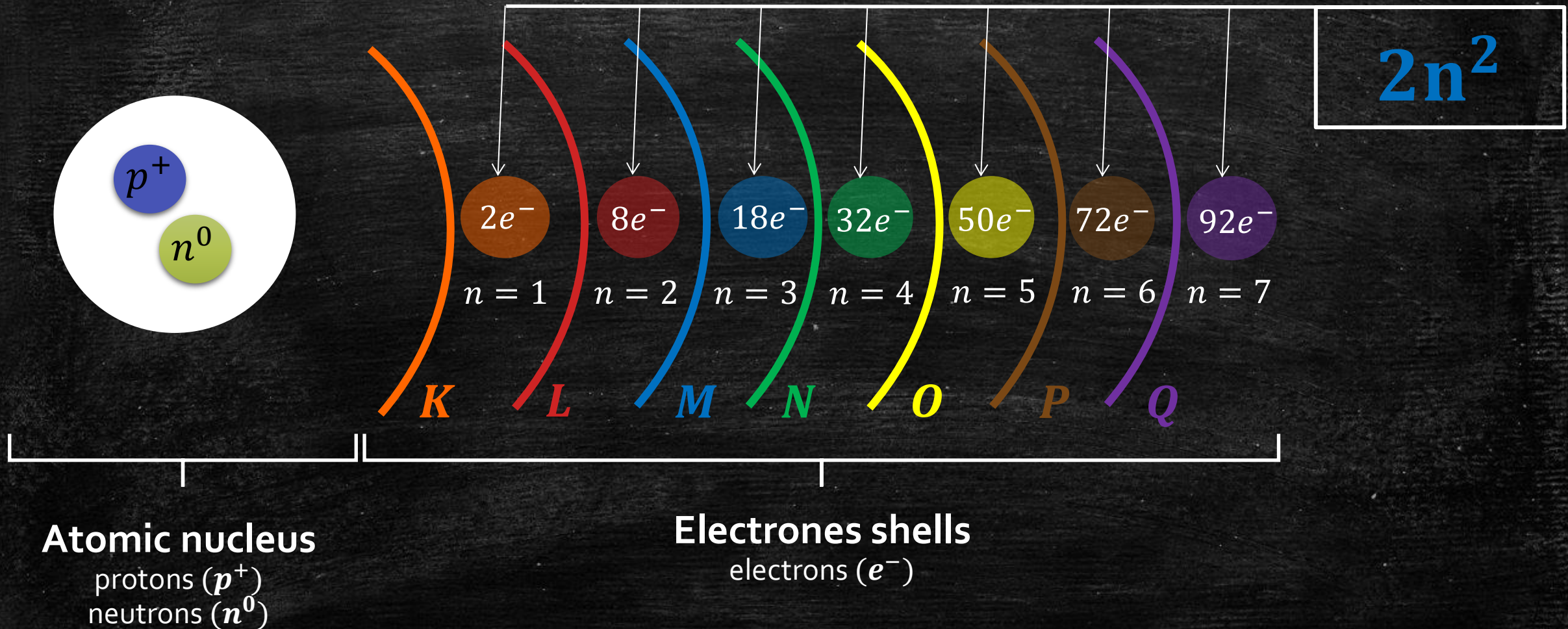
NEUTRON (n^0) – The fundamental particle of the atomic nucleus that has **no charge** (0). The approximate mass of a neutron is $1u$.

ELECTRON (e^-) – The fundamental particle of the atomic nucleus that has a **negative charge** ($1-$). The approximate mass of a electron is $\frac{1}{1840}u$.

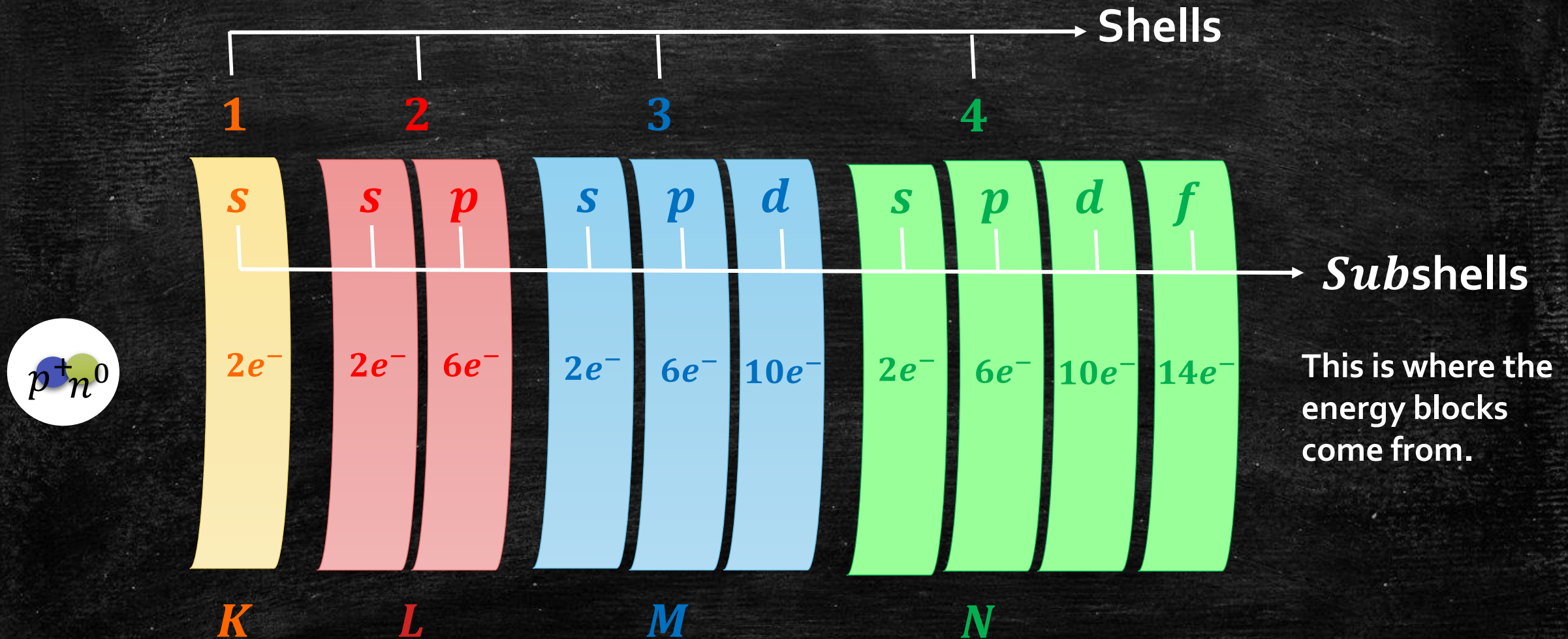
$$\frac{1}{1840}u = 0,000543u$$

Note that the mass of an electron is very small. Therefore, it does not significantly contribute to the mass of the entire atom.

How many electrons can be hold on a shell?



Subshells - s, p, d and f



Atomic and Mass number

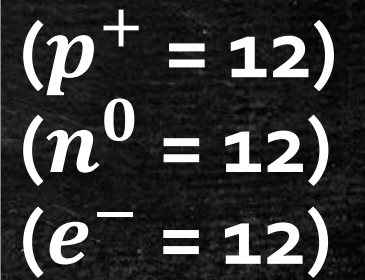
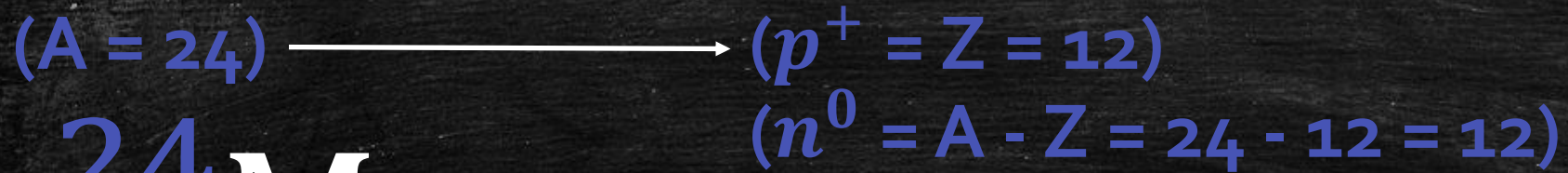
Mass number(A) = Sum of protons and neutrons



Atomic number (Z) = number of protons = number of electrons

Example - part 1

MAGNESIUM:

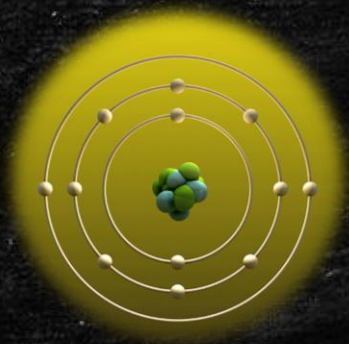


Example - part 2

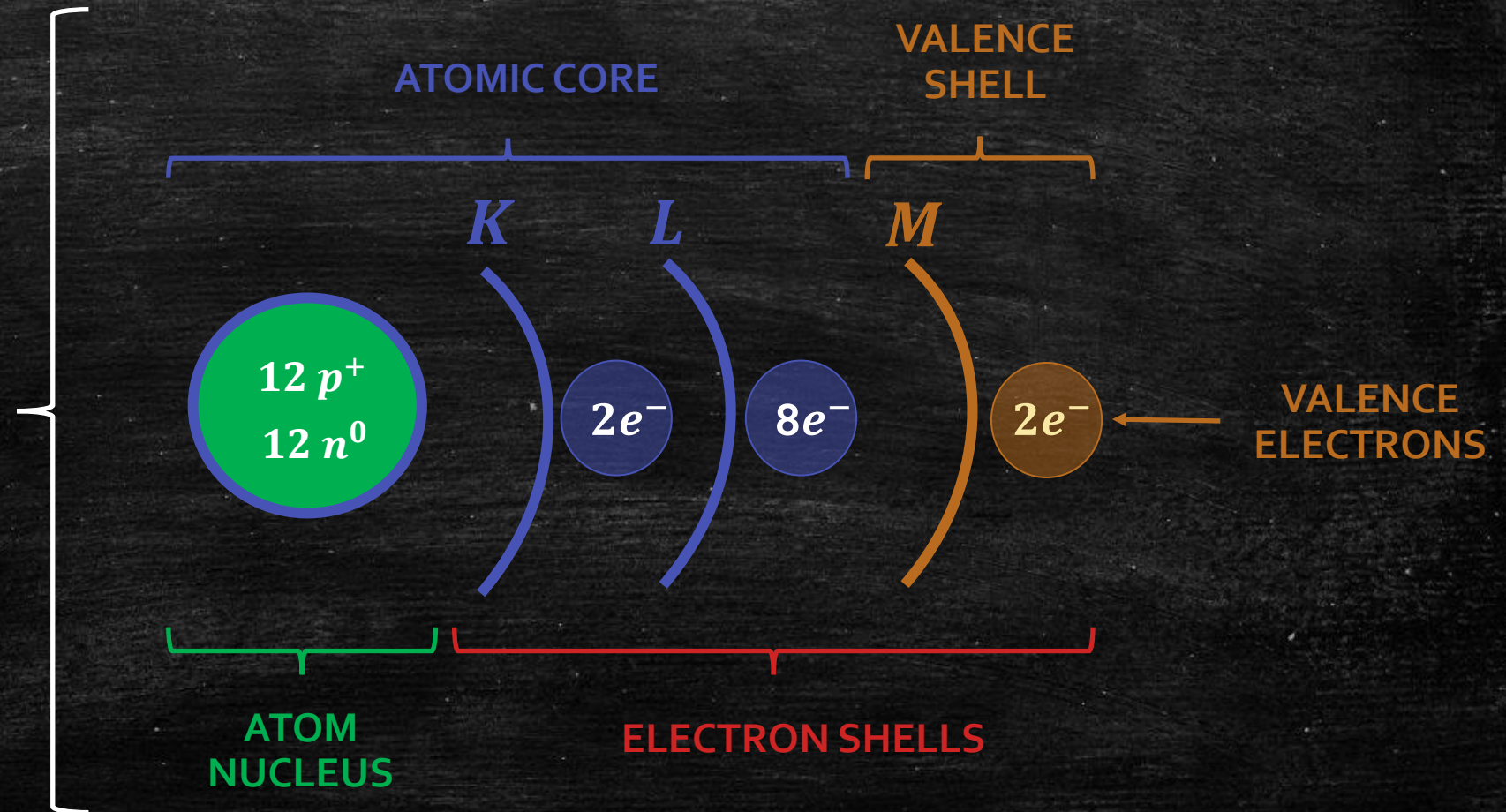
Important information:
number of shells = periodic number

The structure of a „Mg” atom

$$\begin{aligned}(p^+ &= 12) \\ (n^0 &= 12) \\ (e^- &= 12)\end{aligned}$$



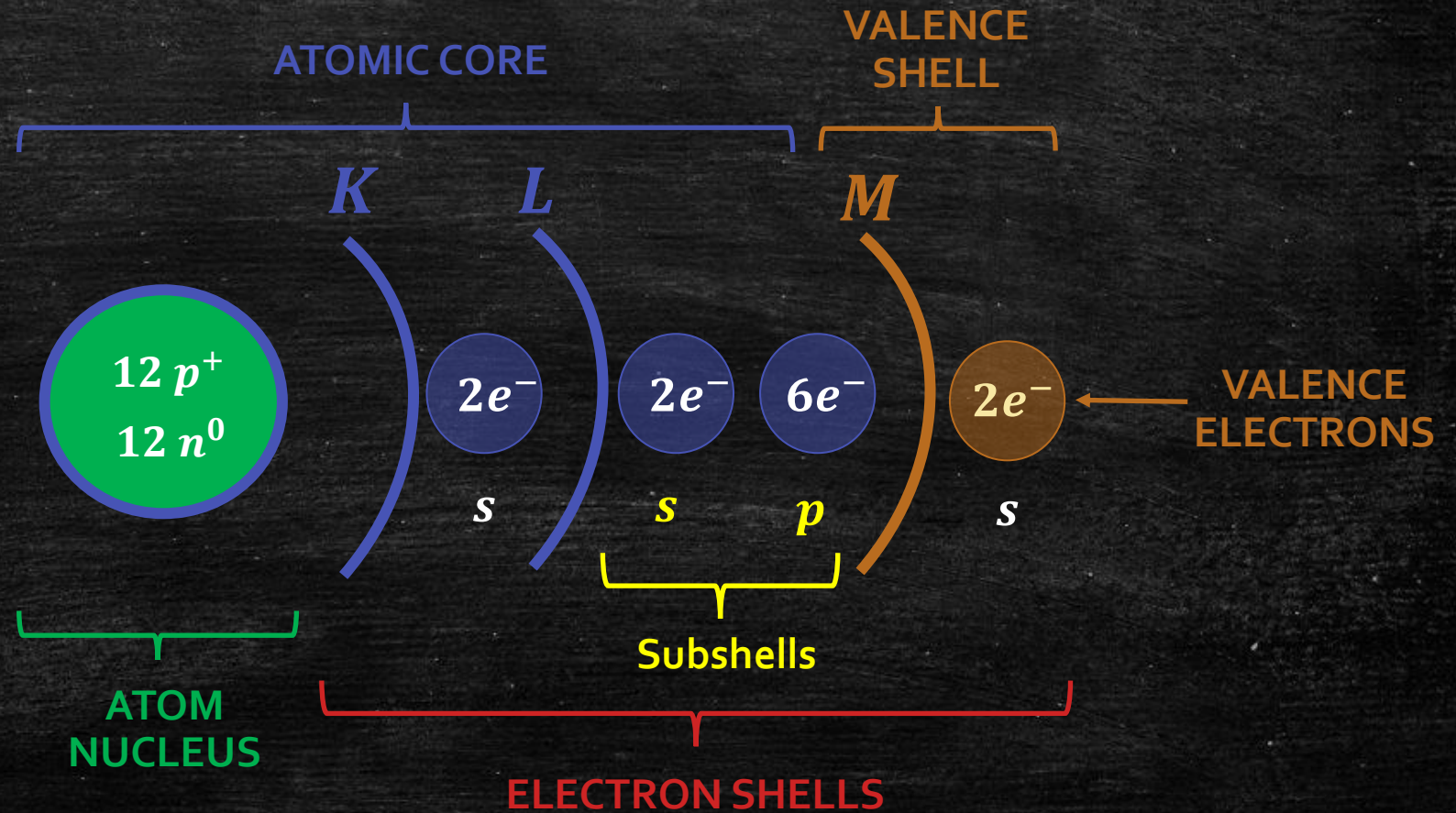
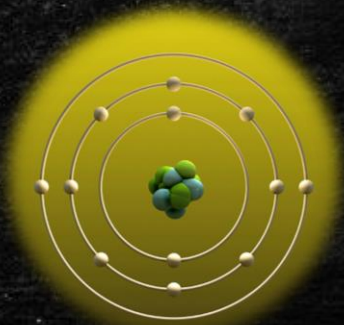
<https://giphy.com/>



Example - part 3

The structure
of a „Mg“ atom

$$\begin{aligned}(p^+ &= 12) \\ (n^0 &= 12) \\ (e^- &= 12)\end{aligned}$$



Now do it yourself 😊

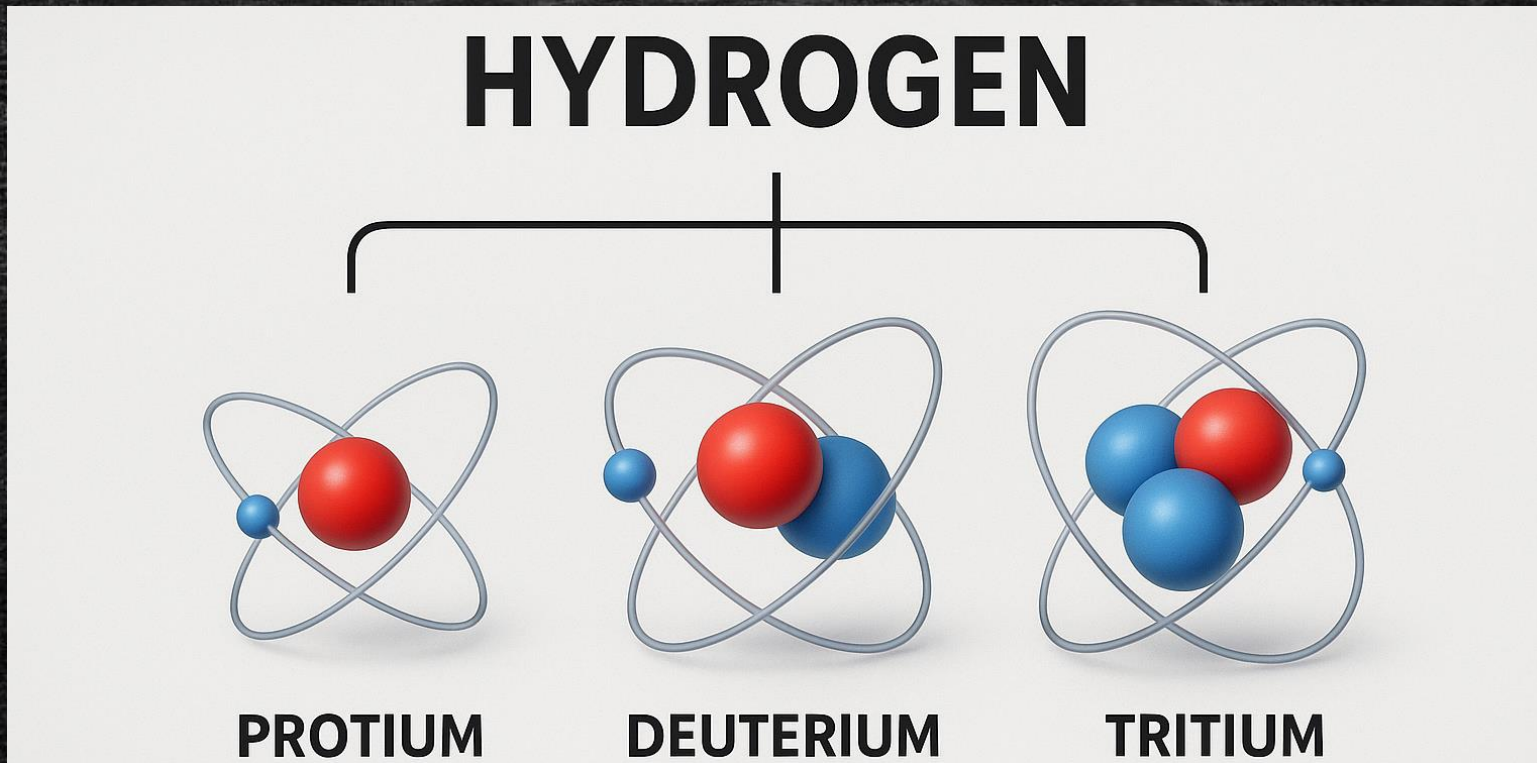
1. Fill the table with appropriate data in your notebook.

Element name	Element symbol	Atom number	Mass number	Protons	Electrones	Neutrones	Periodic number
Carbon							
Hydrogen							
Oxygen							
Lithium							

2. Try skech the simply models of those elements atom in your notebook.

ISOTOPES

Generate by AI



99,985%

0,015%

Trace
amounts

Can you
guess a
definition of
isotopes
based on the
diagram?

ISOTOPES

ISOTOPES – varieties of the same chemical element.

They can be characterized:

- different number of neutrons in the nucleus
- the same number of protons and electrons

Atomic structure: practice

„BUILD AN ATOM“

<https://phet.colorado.edu/en/simulation/build-an-atom>

<https://atom.heredero.org/?lang=en>

