# Unit 3

#### Modeling Atomic Structure

Mr. Maxwell

**PACS** 

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- Atomic Structure
  - Atomic Number
  - Mass Number
  - Bohr Model
    - Energy Levels
  - The Periodic Table
    - groups and periods
  - Valence Electrons

#### **Atomic Number**

The is the number of

in the nucleus of an atom.

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The atomic number is the number of protons in the nucleus of an atom.

The the total number of and in the nucleus of an atom.

The mass number the total number of of an atom.

and

in the nucleus

The mass number the total number of protons and of an atom.

in the nucleus

The mass number the total number of protons and neutrons in the nucleus of an atom.

# Hydrogen

 $^{1}H$ 

# Hydrogen

 $^{1}\mathrm{H}$ 

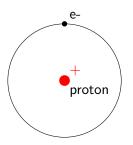
What does the 1 mean?

# Hydrogen

 $^{1}\mathrm{H}$ 

What does the 1 mean?

1 is the total number of neutrons and protons.



 ${}^4_2{
m He}$ 

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m He}$ 

What does the 4 mean?



 ${}_{2}^{4}\mathrm{He}$ 

What does the 4 mean?

4 is the total number of neutrons and protons.

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What does the 2 mean?

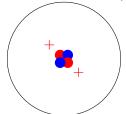
 ${}_{2}^{4}\mathrm{He}$ 

What does the 4 mean?

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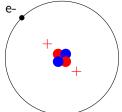
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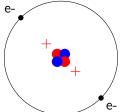
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What does the 4 mean?

4 is the total number of neutrons and protons.

What does the 2 mean?

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 $^{7}_{3}\mathrm{Li}$ 

How many protons does Lithium have?

 $^{7}_{3}\mathrm{Li}$ 

How many protons does Lithium have? 3





 $^{7}_{3}\mathrm{Li}$ 



$$^7_3\mathrm{Li}$$



 $^7_3\mathrm{Li}$ 

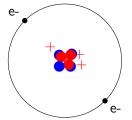


 $^7_3\mathrm{Li}$ 

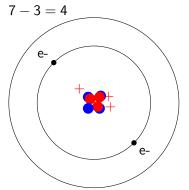
 $^{7}_{3}\mathrm{Li}$ 

 $^{7}_{3}\mathrm{Li}$ 

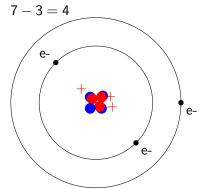
$$7 - 3 = 4$$



 $^7_3\mathrm{Li}$ 



$$^{7}_{3}\mathrm{Li}$$



#### Niels Bohr



The Bohr Model - Bohr proposed that an atom was a nucleus with electrons "orbiting" in different

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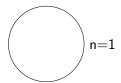
energy, while those

The electrons closest to the nucleus have the lowest energy, while those further from away have energy.

The electrons closest to the nucleus have the lowest energy, while those further from away have higher energy.

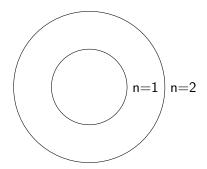
# **Energy Levels**

The electrons closest to the nucleus have the lowest energy, while those further from away have higher energy.



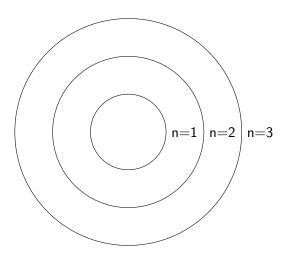
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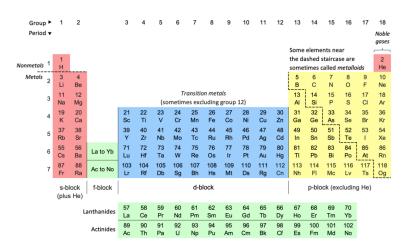


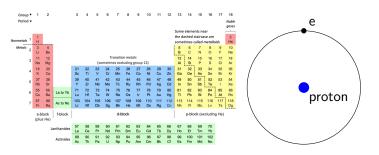
## **Energy Levels**

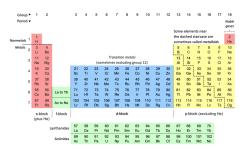
The electrons closest to the nucleus have the lowest energy, while those further from away have higher energy.



## Energy Levels and the Periodic Table















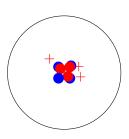




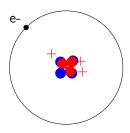


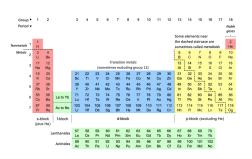


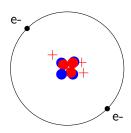


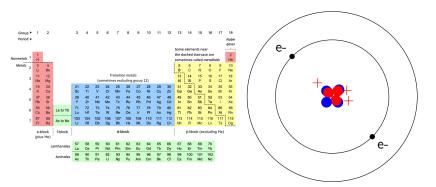


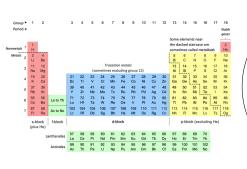


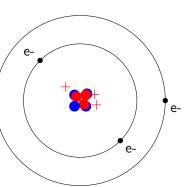


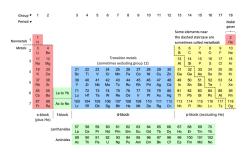


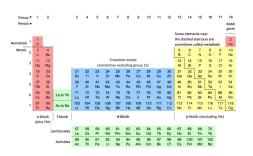




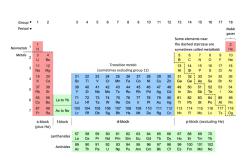


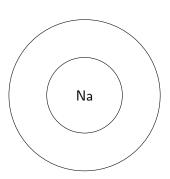


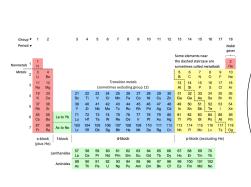


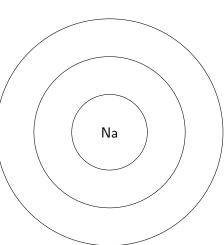




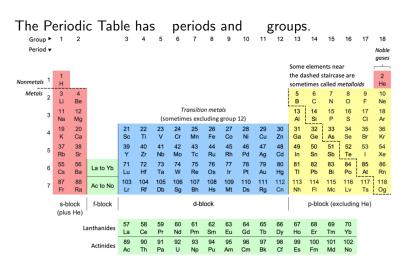




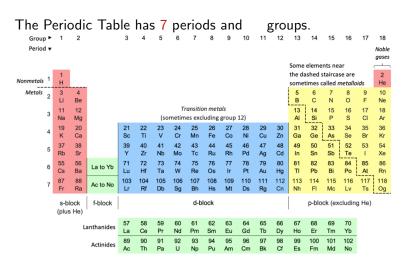




#### The Periodic Table

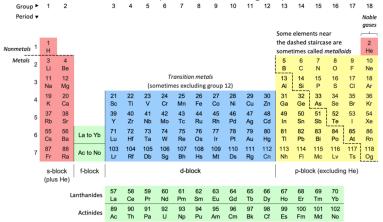


#### The Periodic Table

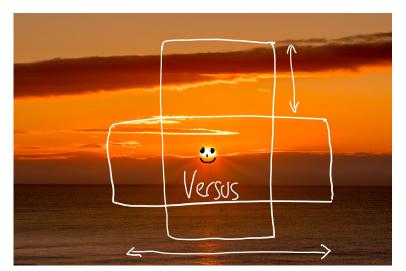


#### The Periodic Table

#### The Periodic Table has 7 periods and 18 groups.



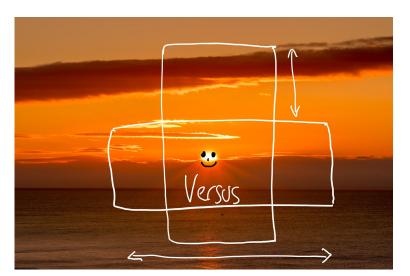
### Horizontal and Vertical



The periods are

and the groups are

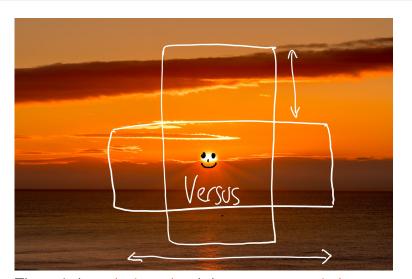
### Horizontal and Vertical



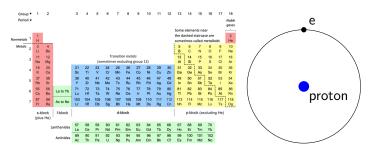
The periods are horizontal and the groups are

16 / 22

### Horizontal and Vertical



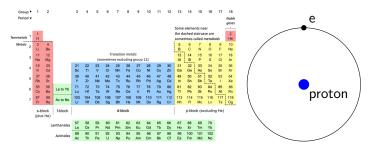
The periods are horizontal and the groups are vertical.



You can know the the periodic table.

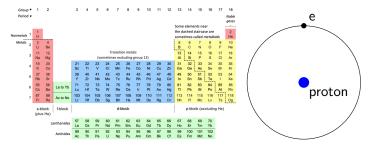
configuration of an element from its

in

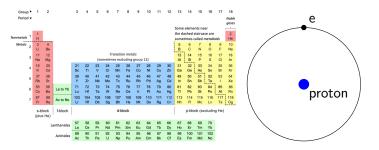


You can know the electron configuration of an element from its the periodic table.

in

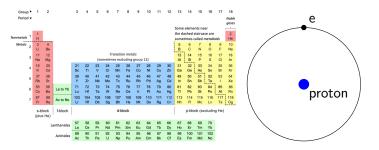


You can know the electron configuration of an element from its position in the periodic table.

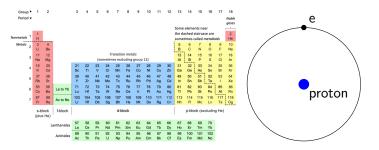


The number of electron number.

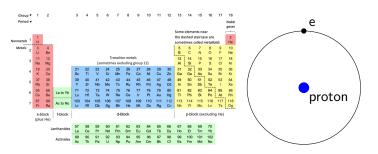
(or energy levels) is equal to the



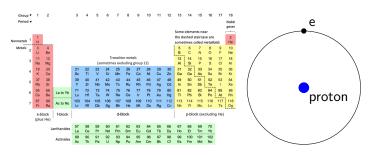
The number of electron shells (or energy levels) is equal to the number.



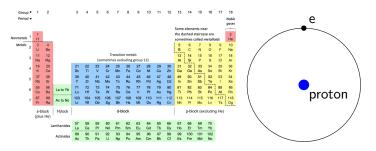
The number of electron shells (or energy levels) is equal to the period number.



The number of valence electrons is related to the



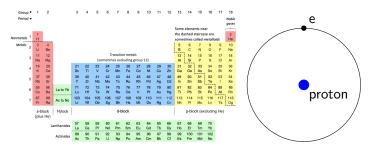
The number of valence electrons is related to the group number.



For atoms in groups and the number of are equal to the group number.

For atoms in groups to the number of are equal to the group number minus 10.

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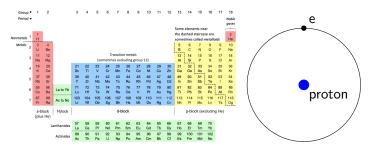


For atoms in groups one and equal to the group number.

the number of

are

For atoms in groups to the number of the group number minus 10.



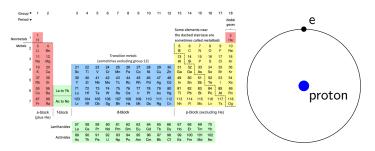
For atoms in groups one and two, the number of equal to the group number.

are

For atoms in groups to the number of the group number minus 10.

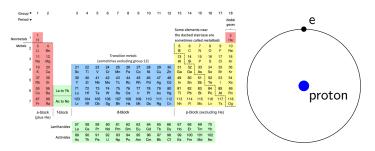
are equal to

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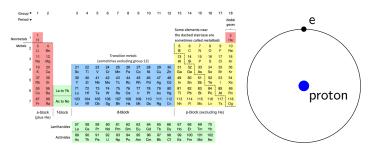
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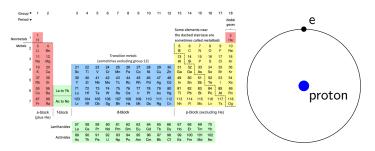
For atoms in groups one and two, the number of valence electrons are equal to the group number.

For atoms in groups 13 to the number of the group number minus 10.



For atoms in groups one and two, the number of valence electrons are equal to the group number.

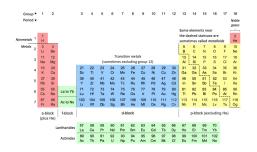
For atoms in groups 13 to 18, the number of the group number minus 10.

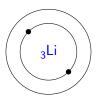


For atoms in groups one and two, the number of valence electrons are equal to the group number.

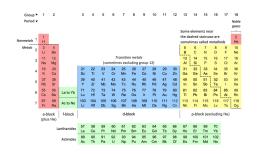
For atoms in groups 13 to 18, the number of valence electrons are equal to the group number minus 10.

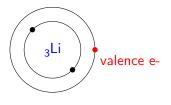
### Valence Electrons of H



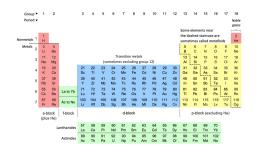


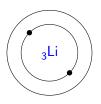
### Valence Electrons of H





### Valence Electrons of Li





### Valence Electrons of Li

