micron STEM

Atoms – Level 3

Reviewed 2025

micron

Copyright guidelines

By using any content provided by the Micron Educator Hub, you acknowledge that Micron Technology, Inc. (“Micron”) is the sole owner of the content and agree that any use of the content provided by the Micron Educator Hub must comply with applicable laws and require strict compliance with these Guidelines:

1. Credit shall be expressly stated by you to Micron for use of the content, including any portion thereof, as follows:
    a. “*© 2011-2025 Micron Technology, Inc. All Rights Reserved. Used with permission.*”
2. You may not use the content in any way or manner other than for educational purposes.
3. You may not modify the content without approval by Micron.
4. You may not use the content in a manner which disparages or is critical of Micron, its employees, or Micron’s products/services.
5. Permission to use the content may be canceled/terminated by Micron at any time upon written notice from Micron to You if You fail to comply with the terms herein.
6. You acknowledge and agree that the content is provided by Micron to You on an “as is” basis without any representations or warranties whatsoever, and that Micron shall have no liability whatsoever arising from Your use of the content. Micron shall ensure that the content does not violate any statutory provisions and that no rights of third parties are infringed by the content or its publication. Otherwise, liability of the parties shall be limited to intent and gross negligence.
7. You acknowledge and agree that the content is the copyrighted material of Micron and that the granting of permission by Micron to You as provided for herein constitutes the granting by Micron to You of a non-exclusive license to use the content strictly as provided for herein and shall in no way restrict or affect Micron’s rights in and/or to the content, including without limitation any publication or use of the content by Micron or others authorized by Micron.
8. Except for the above permission, Micron reserves all rights not expressly granted, including without limitation any and all patent and trade secret rights. Except as expressly provided herein, nothing herein will be deemed to grant, by implication, estoppel, or otherwise, a license under any of Micron’s other existing or future intellectual property rights.

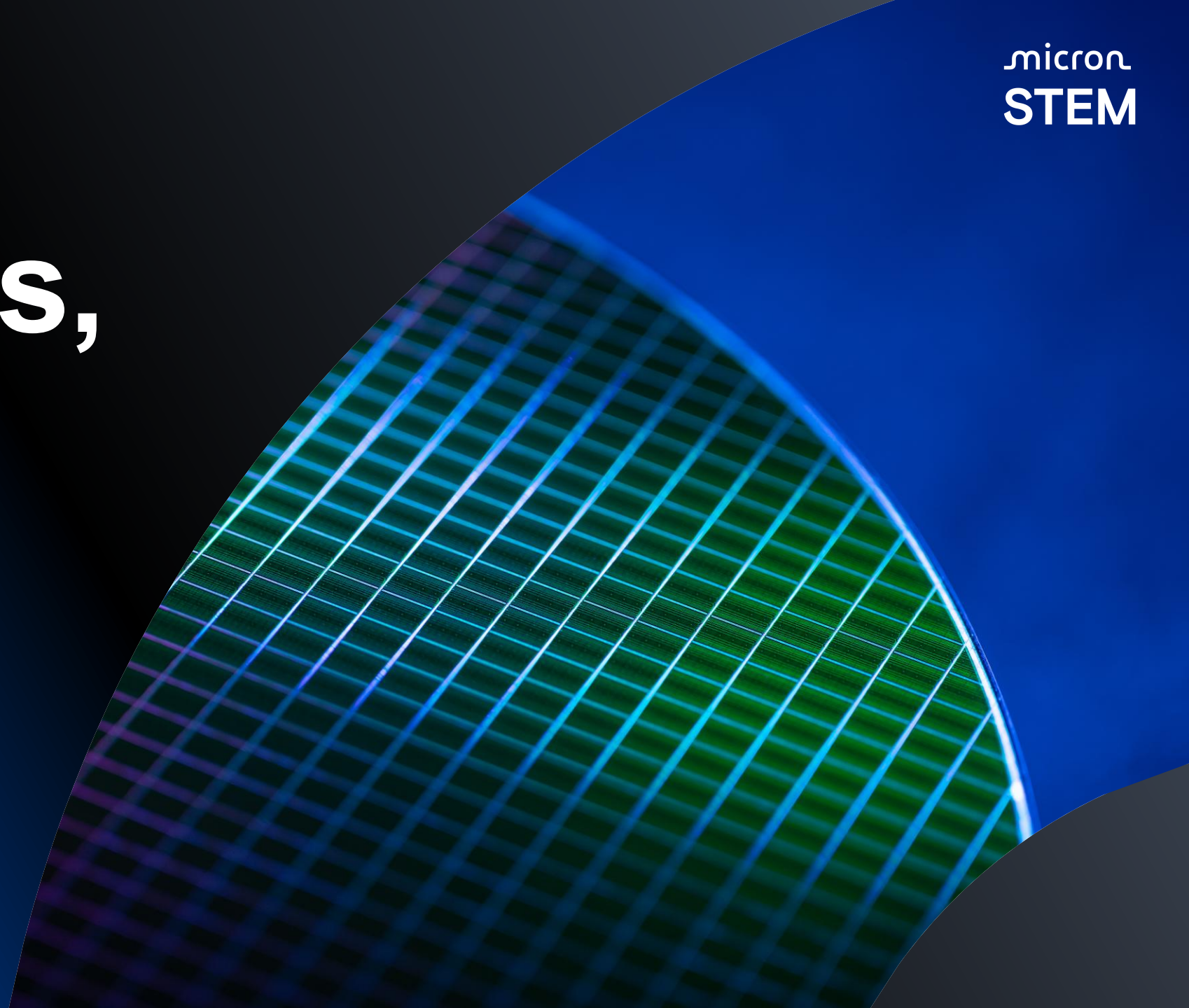
How to cite sources from the Micron Educator Hub

- Micron is committed to collaborate with educators to make semiconductor memory education resources available through the Micron Educator Hub
- The content in the Micron Educator Hub has been identified by Micron as current and relevant to our company
- Please refer to the table on the right for proper citation

Use case	How to cite sources
Whole slide deck or whole document Description: User uses the whole slide deck or whole document AS IS, without any modification	No additional citation required
Full slide or full page Description: User incorporates a full slide or a full page into their own slide deck or document	"© 2011-2025 Micron Technology, Inc. All Rights Reserved. Used with permission."
Portion of a slide or portion of a page Description: User copies a portion of a slide or a portion of a page into a new slide or page	This is not allowed

micron STEM

Molecules, Ions & Isotopes

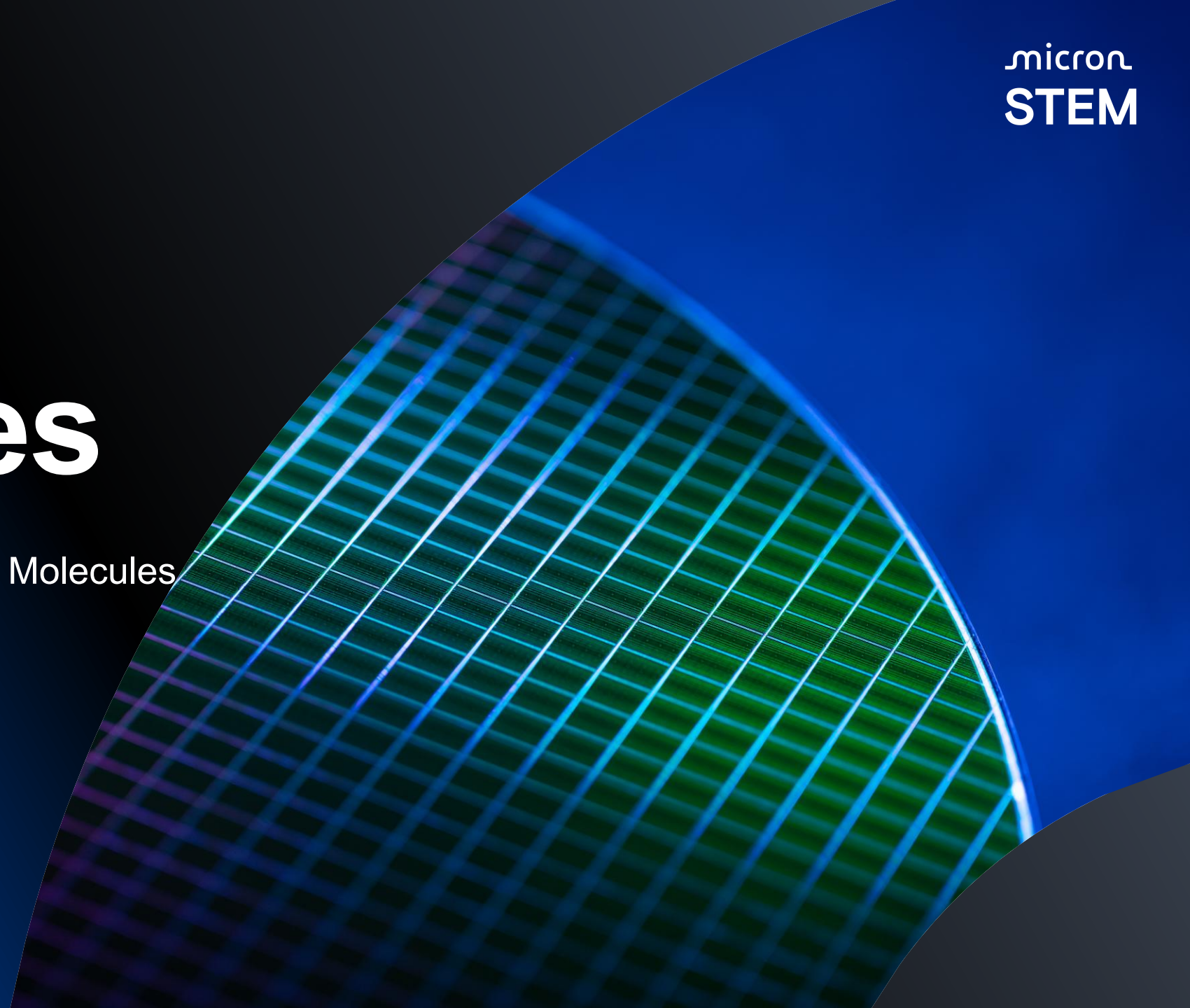


micron

micron
STEM

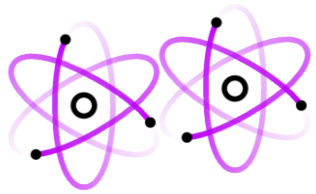
Molecules

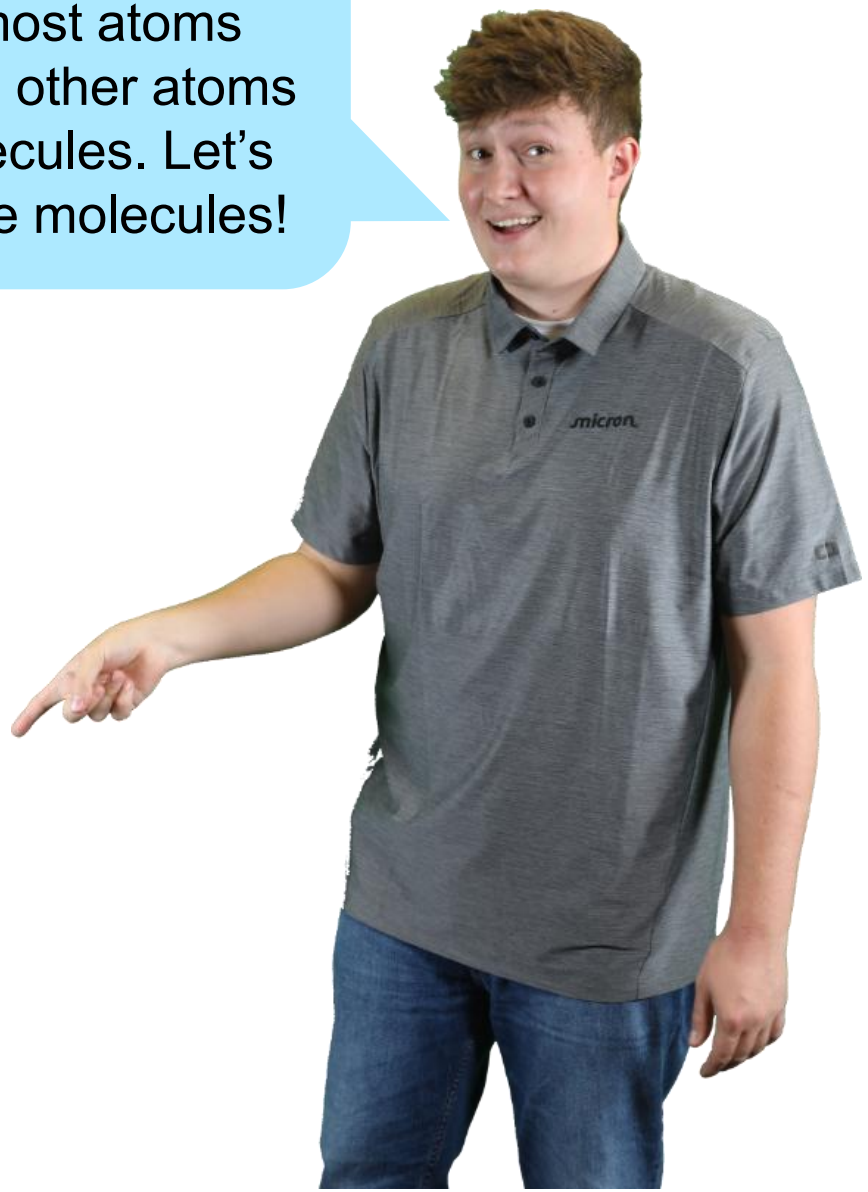
Atoms are the building blocks of Molecules



micron

It’s interesting to note that in nature most atoms combine with other atoms to form molecules. Let’s explore some molecules!





Single element molecules

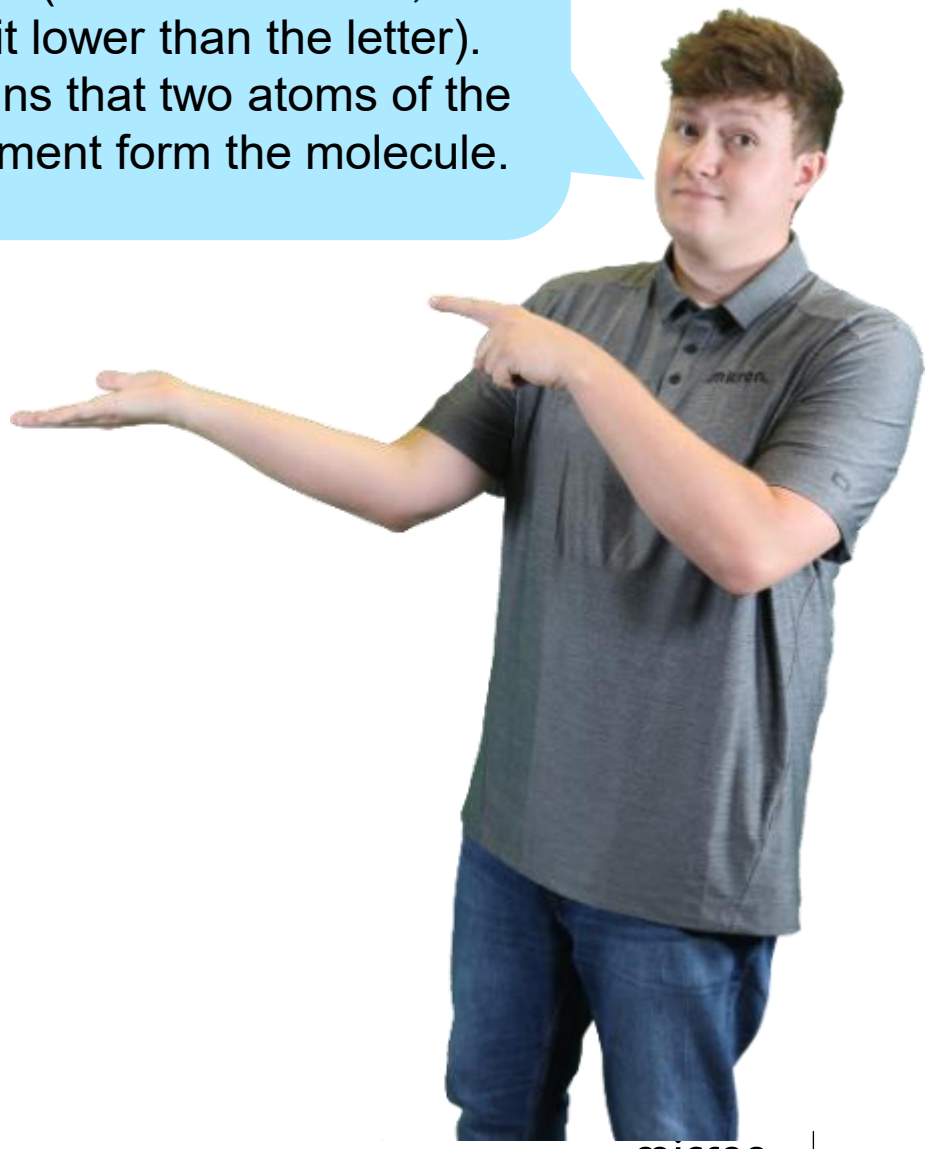
Some molecules are made up of atoms of the same element

Note how we write the number 2 as a subscript (a little bit smaller, and a little bit lower than the letter). That means that two atoms of the same element form the molecule.

H_2 Hydrogen

O_2 Oxygen

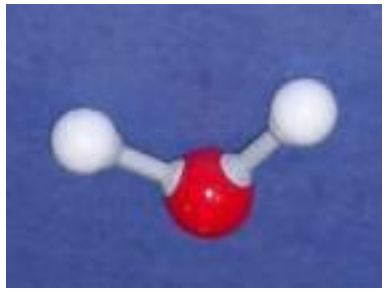
N_2 Nitrogen



Compound molecules

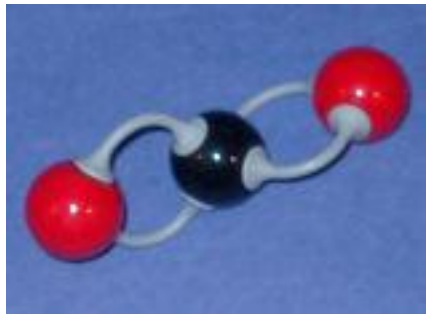
Molecules made up of two or more elements

H_2O ‘Water’

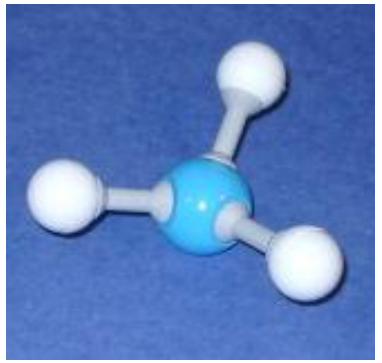


NaCl Sodium Chloride

CH_4 ‘Methane’



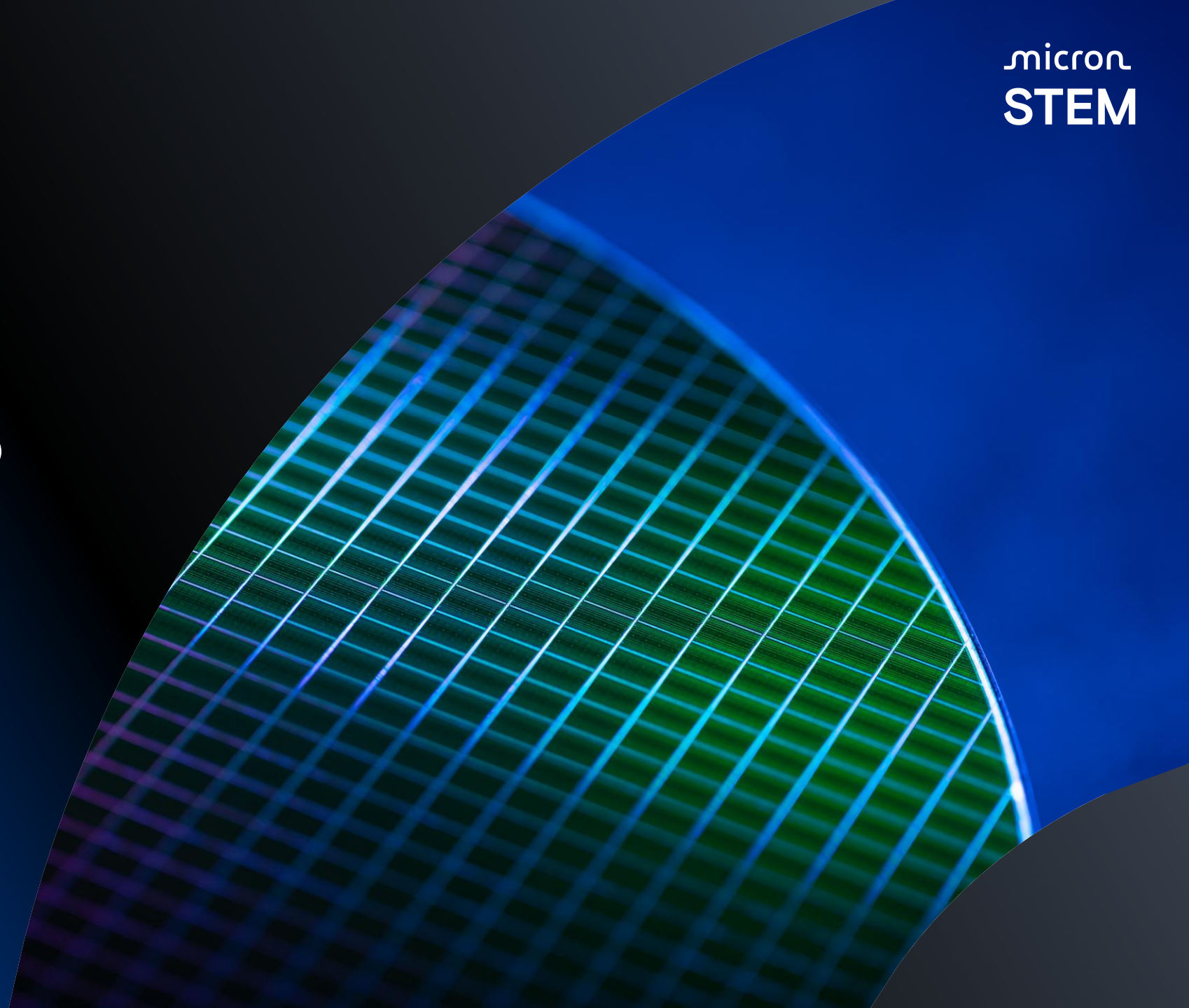
CO_2 Carbon Dioxide



NH_3 ‘Ammonia’

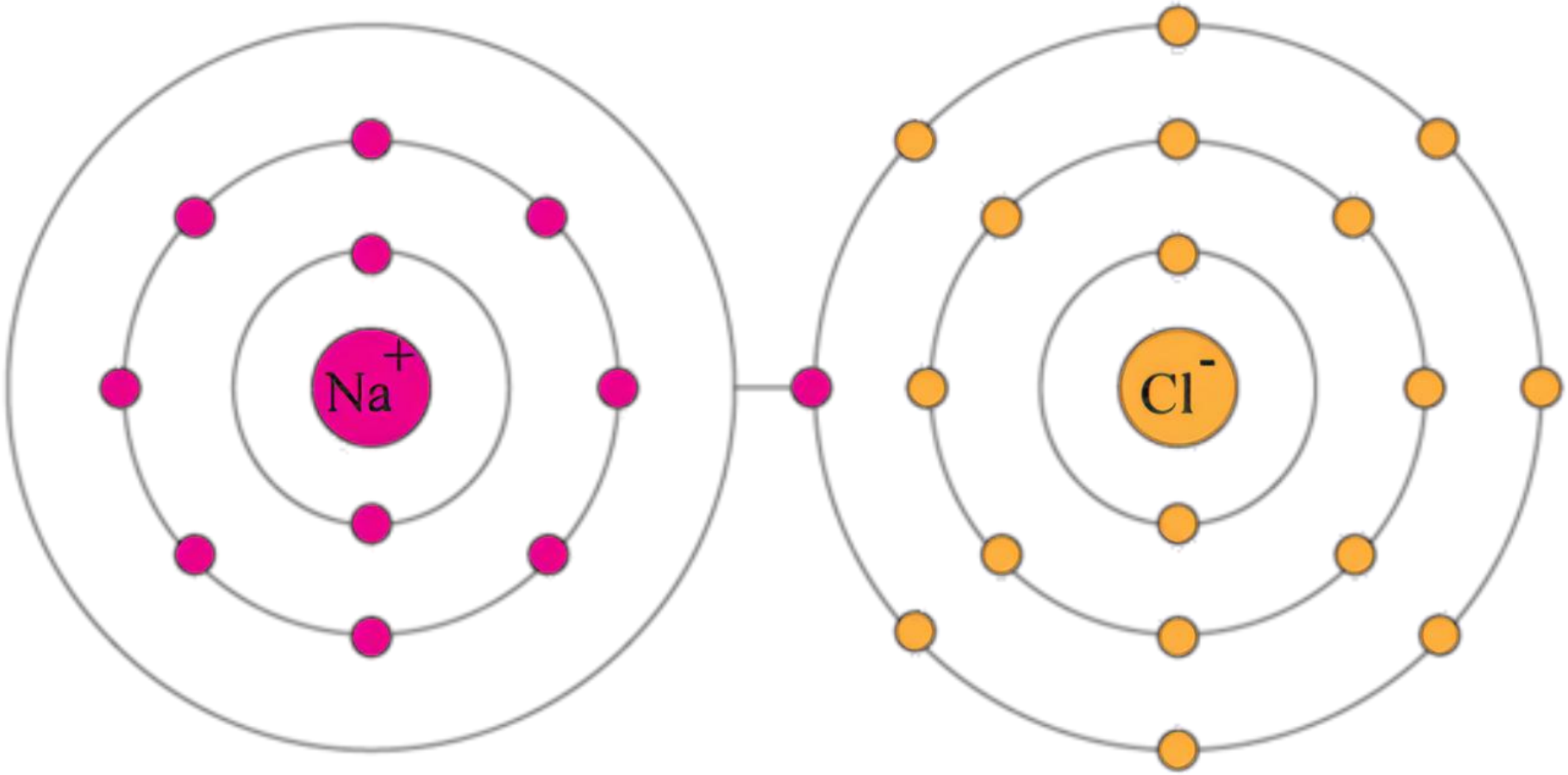
micron
STEM

Ions and Isotopes



micron

A look at the Sodium-Chlorine molecule



A look at the Lithium atom

Atomic Number	3
Atomic Symbol	Li
Name	Lithium
Atomic Mass	6.941 (7)

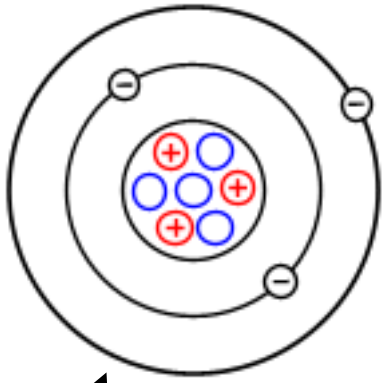
Atomic Number = Number of Protons = 3

Atomic Mass - Atomic Number = Number of Neutrons

7 - 3 = 4

Number of Protons = Number of Electrons = 3

Lithium Atom

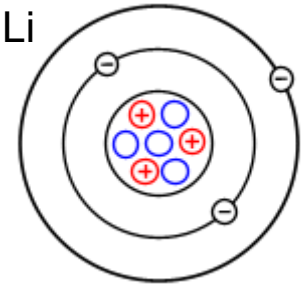


A look at the Lithium Ion

Ions

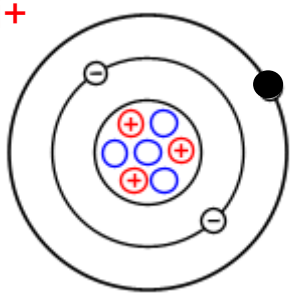
Atoms with “missing” or “extra” electrons.

Li



Lithium atom
3 protons
4 neutrons
3 electrons

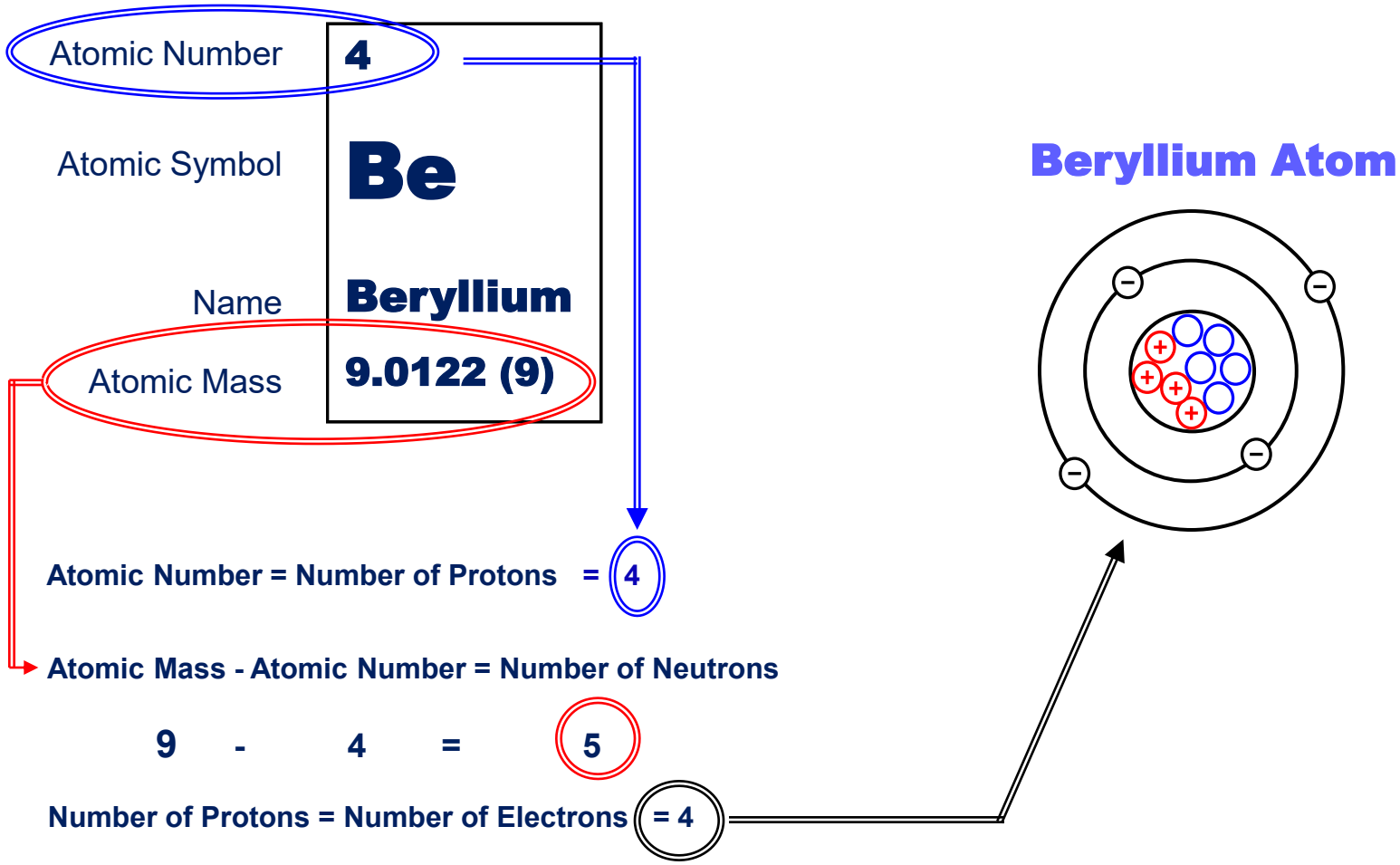
Li+



Lithium ion
3 protons
4 neutrons
2 electrons

With ions it’s all about the electrons. An ion can have **positive charge** when it is missing electrons, or it can have **negative charge** when it acquired extra electrons!

A look at the Beryllium atom

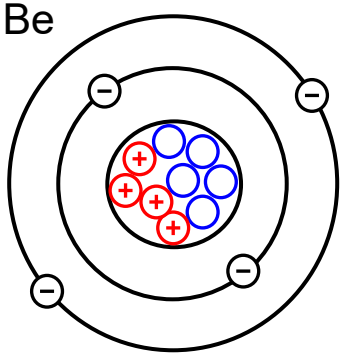


A look at the Beryllium Isotope

Isotopes

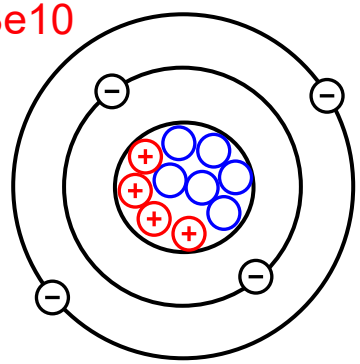
Variants of an element with a different number of neutrons.

Be



Beryllium atom
4 protons
5 neutrons
4 electrons

Be10



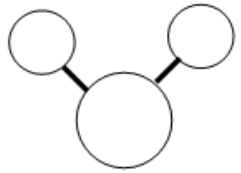
Beryllium isotope
4 protons
6 neutrons
4 electrons

With isotopes it's all about the number of neutrons!

Activity

Molecules

1. Color in the Molecule Color Key molecules with colored pencils as indicated.
2. Determine the number of elements in each molecule and write it down.
3. Draw and color the molecule with the correct number of elements.
4. Make each molecule model using appropriately colored gumdrops and toothpicks.

Molecule	Elements	Draw It!
Water H_2O	H = _____ O = _____ N = _____ C = _____	
Carbon Dioxide CO_2	H = _____ O = _____ N = _____ C = _____	
Ammonia NH_3	H = _____ O = _____ N = _____ C = _____	
Methane CH_4	H = _____ O = _____ N = _____ C = _____	

Molecule Color Key

Hydrogen (yellow)

Oxygen (red)

Nitrogen (green)

Carbon (black)

ATOMS: Ions & Isotopes

Refer to a Periodic Table and the Key below to fill out this table for each element.

3. Assemble the nucleus using the proper number of large colored and white marshmallows. Stick them together with toothpicks.
4. Select the proper number of small colored marshmallows (all one color) as your electrons. Attach them one at a time to the nucleus with toothpicks.
5. Turn the lithium atom into an ion and note the information.
6. Turn either the lithium atom or the beryllium atom into an isotope. Record what you did.

ATOM	ATOMIC SYMBOL	ATOMIC NUMBER	NUMBER OF PROTONS (see key)	ATOMIC MASS	NUMBER OF NEUTRONS (see key)	NUMBER OF ELECTRONS (see key)
Lithium						
Beryllium						
Lithium Ion						
Isotope: _____						

Atomic Number	**3**
Atomic Symbol	**Li**
Name	**Lithium**
Atomic Mass	**7**

KEY

Number of Protons = Atomic Number
Number of Neutrons = Subtract Atomic Number from Atomic Mass
Number of Electrons = Number of Protons
Ions: Add or subtract an electron from the element
Isotope: Add or subtract a neutron from the element

Congratulations on completing the Atoms – Level 3 module!

Ready for more? Check out other modules at the Micron Educator Hub. See you soon!

micron

STEM

micron