**PhET Simulation: Build an Atom**

<https://phet.colorado.edu>

Open the ATOM portion of the sim.

Open *Element* and *Mass Number*.

Part I: Isotopes

Complete the following table by adding the number of protons/neutrons/electrons as stated.

Reset between each problem.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Element | #protons | #neutrons | #electrons | Mass Number |
|  | 1 | 0 | 1 |  |
|  | 1 | 1 | 1 |  |
|  | 1 | 2 | 2 |  |
|  | 6 | 6 | 6 |  |
|  | 6 | 8 | 6 |  |

11. **Isotopes** are different versions of the same element with varying numbers of

1. protons
2. neutrons
3. electrons

Isotopes are written as the **element name-mass number**. Examples: Bromine-79 and Bromine-81.

Write the names of the 3 isotopes of hydrogen and the 2 isotopes of carbon using the information from the table above.

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Part II: Ions

Remain on ATOM.

Open *Net Charge*.

Check *Element* and *Neutral/ion*.

1. What is the electrical charge on a proton?
2. What is the electrical charge on a neutron?
3. What is a cation?
4. What is an anion?

Fill in the table based on the given information.

Reset between each problem.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Element | #protons | #neutrons | #electrons | neutral (N) or  ion (I)? | Net charge |
|  | 1 | 0 | 0 |  |  |
|  | 2 | 2 | 2 |  |  |
|  | 3 | 4 | 2 |  |  |
|  | 4 | 5 | 2 |  |  |
|  | 5 | 6 | 2 |  |  |
|  | 6 | 6 | 6 |  |  |
|  | 7 | 7 | 10 |  |  |
|  | 8 | 8 | 10 |  |  |
|  | 9 | 10 | 10 |  |  |
|  | 10 | 10 | 10 |  |  |

29. An atom that has an electrical charge is called an \_\_\_\_\_\_\_\_\_\_.

30. An atom with 15 protons and 18 electrons has a charge of \_\_\_\_\_\_\_\_\_\_.

31. An atom with 12 protons and 10 electrons has a charge of \_\_\_\_\_\_\_\_\_\_.

You are now ready to play the game!

Write your score below.

Find the element: \_\_\_\_\_

What is the mass number? \_\_\_\_\_