

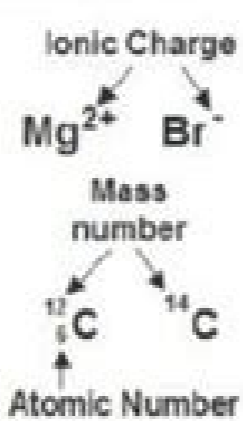
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Isotope and Ion Notation Extra Practice

Background

Isotopes are atoms of the same element with different numbers of neutrons. Ions are atoms of the same element with a charge due to the gain or loss of electrons. Ions and isotopes are both expressed with specific forms of notation.

Ions will have a + or - sign next to the chemical symbol of the element. Magnesium has a 2+ charge, indicating that it has *lost two electrons*. Bromine has a - charge, indicating that it has *lost one electron*.

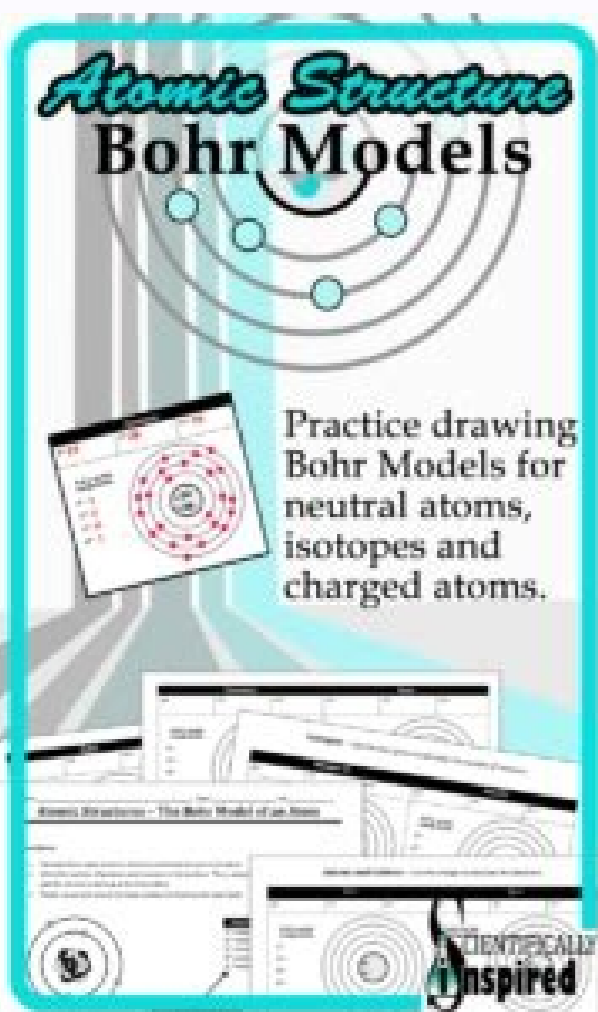


Isotopes must be accompanied by the *mass number*, since the number of neutrons has changed. The atomic number may also be included. Each of these isotopes of carbon has 6 protons. Carbon-12 has 6 neutrons, while carbon-14 has 8 neutrons.

Practice

For each of the element symbols below, indicate whether it represents an *ion*, *isotope*, or *neutral atom*. Use a periodic table to identify element name and the number of protons, neutrons, and electrons present.

Symbol	Name	Classification	# of Protons	# of Neutrons	# of Electrons
Al ³⁺	Aluminum	Cation	13	14	10
	Hydrogen-3	Neutral Atom			
	Chlorine				18
Ag ⁺					
¹⁸ O		Neutral Atom			
	Scandium		21		19
			34	46	
S ²⁻					
¹⁹⁷ Au					19
	Gold-198				
P ³⁻			15		



Worksheet 12 **Topic 3**

Set C: Finding in atoms and ions **Objective:** To use your ability to determine electron shell structure and atom symbols.

Table 1: Complete the table below based on the symbol given.

Symbol	Atomic number	Number of protons	Number of neutrons	Number of electrons	Electron configuration
C					
C ⁺					
Sr					
Sr ²⁺					
²⁴ Mg					
²⁴ Mg ²⁺					
Pg					
Pg ²⁺					

Set D: Determining charge of ions **Objective:** To use your ability to determine charge of ions based on the number of subatomic particles.

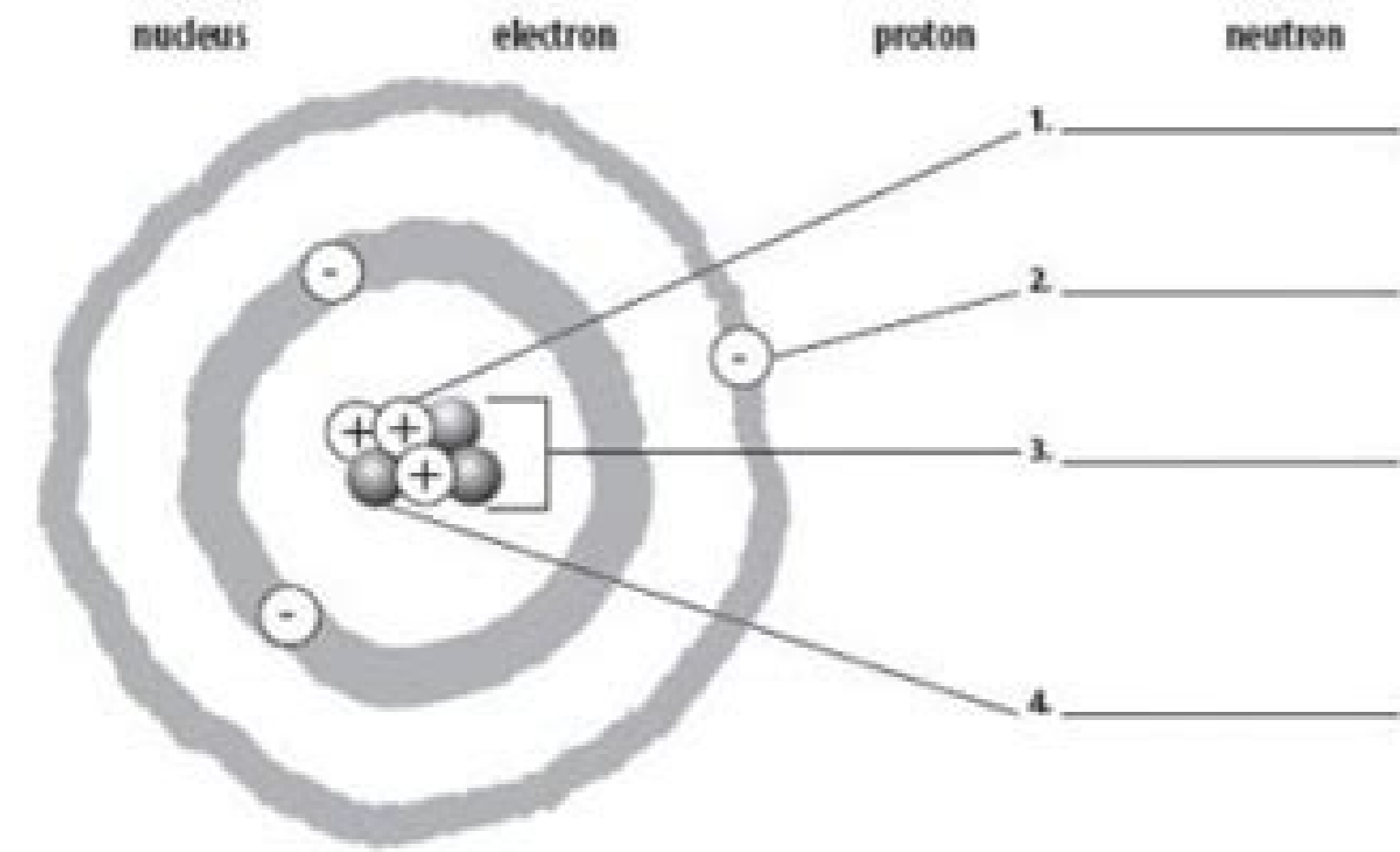
21. Atom A: 40 protons, 42 neutrons, 42 electrons.	Charge =
22. Atom B: Mass number of 200, nuclear charge of 81, and 81 electrons.	Charge =
23. Atom C: Nuclear charge of 33, 36 electrons, 39 neutrons.	Charge =
24. Atom D: 54 electrons, 122 neutrons, atomic number 52.	Charge =
25. Atom E: 28 protons, nuclear charge of 22, 28 electrons.	Charge =

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Directed Reading for Section 1 • Structure of Matter

Content Mastery

Directions: Study the following diagram. Then label the parts of the atom using the correct terms from the list.



Directions: Complete the following sentences using the terms listed below.

- sub-atomic matter
- atoms
- neutral
- proton
- nucleus
- neutron
- conservation of matter
- electron

- A(n) _____ is a particle with a positive charge.
- Most types of matter are made up of small particles called _____.
- _____ is anything that has mass and takes up space.
- A(n) _____ is a particle with no charge at all.
- A(n) _____ is a particle with a negative charge.
- The law of _____ of matter states that matter is neither created or destroyed—only changed in form.
- Atoms are made up of _____ particles.
- Matter that has an equal amount of positive and negative charge is said to be _____.
- Most of the mass of an atom is concentrated in the _____.

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Element	Symbol	Atomic Number	Group
Hydrogen	H	1	1
Helium	He	2	18
Lithium	Li	3	1
Beryllium	Be	4	2
Boron	B	5	13
Carbon	C	6	14
Nitrogen	N	7	15
Oxygen	O	8	16
Fluorine	F	9	17
Neon	Ne	10	18
Sodium	Na	11	1
Magnesium	Mg	12	2
Aluminum	Al	13	13
Silicon	Si	14	14
Phosphorus	P	15	15
Sulfur	S	16	16
Chlorine	Cl	17	17
Argon	Ar	18	18
Potassium	K	19	1
Calcium	Ca	20	2
Scandium	Sc	21	3
Titanium	Ti	22	4
Vanadium	V	23	5
Chromium	Cr	24	6
Manganese	Mn	25	7
Iron	Fe	26	8
Cobalt	Co	27	9
Nickel	Ni	28	10
Copper	Cu	29	11
Zinc	Zn	30	12
Gallium	Ga	31	13
Germanium	Ge	32	14
Arsenic	As	33	15
Selenium	Se	34	16
Bromine	Br	35	17
Krypton	Kr	36	18
Rubidium	Rb	37	1
Strontium	Sr	38	2
Yttrium	Y	39	3
Zirconium	Zr	40	4
Niobium	Nb	41	5
Molybdenum	Mo	42	6
Technetium	Tc	43	7
Ruthenium	Ru	44	8
Rhodium	Rh	45	9
Palladium	Pd	46	10
Silver	Ag	47	11
Cadmium	Cd	48	12
Indium	In	49	13
Tin	Sn	50	14
Antimony	Sb	51	15
Tellurium	Te	52	16
Iodine	I	53	17
Xenon	Xe	54	18
Cesium	Cs	55	1
Barium	Ba	56	2
Lanthanum	La	57	3
Cerium	Ce	58	4
Praseodymium	Pr	59	5
Neodymium	Nd	60	6
Europium	Eu	61	7
Gadolinium	Gd	62	8
Terbium	Tb	63	9
Dysprosium	Dy	64	10
Ho	65	11	
Er	66	12	
Tm	67	13	
Yb	68	14	
Lu	69	15	
Hafnium	Hf	72	6
Tantalum	Ta	73	7
Tungsten	W	74	8
Rhenium	Re	75	9
Osmium	Os	76	10
Iridium	Ir	77	11
Platinum	Pt	78	12
Gold	Au	79	11
Mercury	Hg	80	12
Thallium	Tl	81	13
Lead	Pb	82	14
Bismuth	Bi	83	15
Polonium	Po	84	16
Astatine	At	85	17
Radium	Ra	88	2
Actinium	Ac	89	3
Thorium	Th	90	4
Protactinium	Pa	91	5
Uranium	U	92	6
Np	93	7	
Pu	94	8	
Am	95	9	
Cm	96	10	
Bk	97	11	
Cf	98	12	
Es	99	13	
Fm	100	14	
Mendelevium	Md	101	15
Nobelium	Nb	102	16
Lr	103	17	
Rf	104	18	
Hs	105	18	
Mt	106	18	
Ds	107	18	
Rg	108	18	
Cn	112	18	
Fl	114	16	
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