collisions®

Name: Key

Collisions Username: _____

Class: _____

Atoms Quest

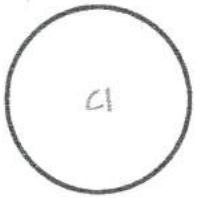
Complete this quest using the Challenge Levels 6 - 13 in the Atoms game.

MISSION 1. GATHER YOUR INTEL

Use your Collisions gameplay experience to gather the following intel for Atoms levels 6 - 13:

1. Label the correct element symbol in the circle.
2. List the # of protons found in the atom.
3. List the # of electrons found in the atom.

Sample Target



# of Protons: 17

# of Electrons: 17

MISSION 2. EXPOSE THE DETAILS

Use your expertise to expose the following information for each target atom.

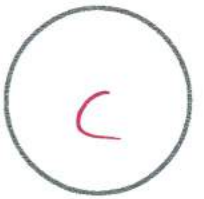
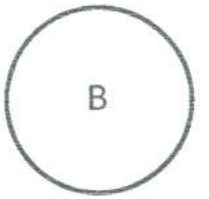
	Sample Target
Element Name	Chlorine
Atomic Number	17
Average Atomic Mass	35.453
~~# of Neutrons~~	~~17~~
Metal, Nonmetal, or Metalloid?	Nonmetal
Electron Configuration	$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^5$
# of Valence Electrons	7
Group Name	Halogen
Number of Energy Levels	3
# of Unpaired Electrons	1

Atoms - Challenge Level 6

MISSION 1. GATHER YOUR INTEL

Note:
Atom 1/3 could also be
N and Li

(smallest ⟶ largest)

Atom 1		Atom 2		Atom 3
	<		<	
# of Protons: 6 # of Electrons: 6		# of Protons: 5 # of Electrons: 5		# of Protons: 4 # of Electrons: 4

MISSION 2. EXPOSE THE DETAILS

	Atom 1	Atom 2	Atom 3
Element Name	Carbon	Boron	Beryllium
Atomic Number	6	5	4
Average Atomic Mass	12.011	10.81	9.012
~~# of Neutrons~~	—	—	—
Metal, Nonmetal, or Metalloid?	Nonmetal	Metalloid	Metal
Electron Configuration	$1s^2 2s^2 2p^2$	$1s^2 2s^2 2p^1$	$1s^2 2s^2$
# of Valence Electrons	4	3	2
Group Name		—	alkaline earth metals
Number of Energy Levels	2	2	2
# of Unpaired Electrons	0	1	0

Atoms - Challenge Level 7

MISSION 1. GATHER YOUR INTEL

Note:
Atoms 1/3 could also be
O/Be
N/B

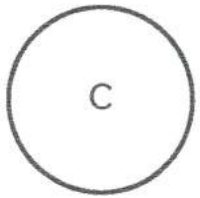
(smallest ⟶ largest)

Atom 1

# of Protons: 9
# of Electrons: 9

<

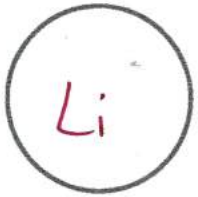
Atom 2



# of Protons: 6
# of Electrons: 6

<

Atom 3



# of Protons: 3
# of Electrons: 3

MISSION 2. EXPOSE THE DETAILS

	Atom 1	Atom 2	Atom 3
Element Name	Fluorine	carbon	Lithium
Atomic Number	9	6	3
Average Atomic Mass	18.998	12.011	6.941
~~# of Neutrons~~			
Metal, Nonmetal, or Metalloid?	nonmetal	nonmetal	metal
Electron Configuration	$1s^2 2s^2 2p^5$	$1s^2 2s^2 2p^2$	$1s^2 2s^1$
# of Valence Electrons	7	4	1
Group Name	halogens		alkali metals
Number of Energy Levels	2	2	2
# of Unpaired Electrons	1	0	1

Atoms - Challenge Level 8

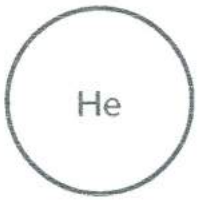
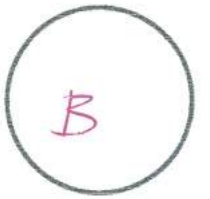
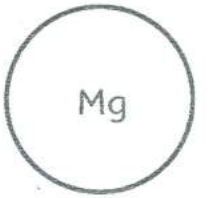
MISSION 1. GATHER YOUR INTEL

2/3 could also be

F/C

O/N

(smallest ⟶ largest)

Atom 1	<	Atom 2	<	Atom 3	<	Atom 4
						
# of Protons: 2 # of Electrons: 2		# of Protons: 10 # of Electrons: 10		# of Protons: 5 # of Electrons: 5		# of Protons: 12 # of Electrons: 12

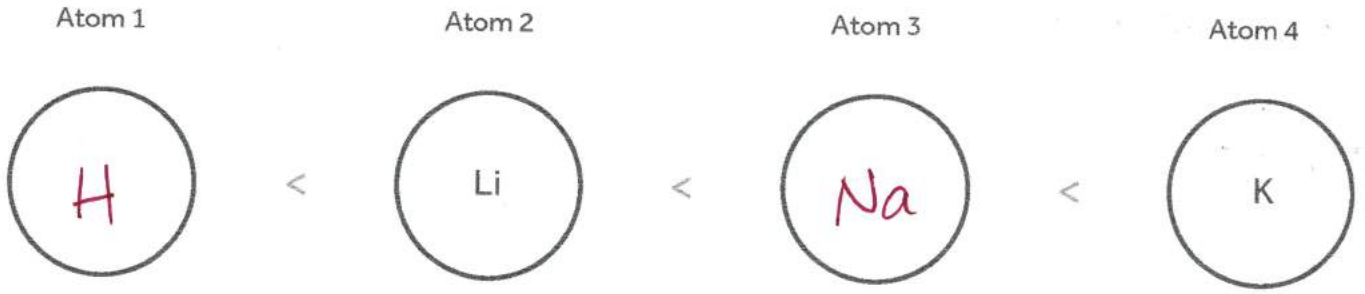
MISSION 2. EXPOSE THE DETAILS

	Atom 1	Atom 2	Atom 3	Atom 4
Element Name	Helium	Neon	Boron	Magnesium
Atomic Number	2	10	5	12
Average Atomic Mass	4.003	20.180	10.811	24.305
~~# of Neutrons~~	—	—	—	—
Metal, Nonmetal, Metalloid?	nonmetal	nonmetal	metalloid	metal
Electron Configuration	$1s^2$	$1s^2 2s^2 2p^6$	$1s^2 2s^2 2p^1$	$1s^2 2s^2 2p^6 3s^2$
# of Valence Electrons	2	8	3	2
Group Name	noble gases	noble gases		alkaline earth metals
# of Energy Levels	1	2	2	3
# of Unpaired Electrons	0	0	1	0

Atoms - Challenge Level 9

MISSION 1. GATHER YOUR INTEL

(smallest ⟶ largest)



Atom 1: # of Protons: 1, # of Electrons: 1

Atom 2: # of Protons: 3, # of Electrons: 3

Atom 3: # of Protons: 11, # of Electrons: 11

Atom 4: # of Protons: 19, # of Electrons: 19

MISSION 2. EXPOSE THE DETAILS

	Atom 1	Atom 2	Atom 3	Atom 4
Element Name	Hydrogen	Lithium	Sodium	Potassium
Atomic Number	1	3	11	19
Average Atomic Mass	1.008	6.941	22.990	39.098
~~# of Neutrons~~				
Metal, Nonmetal, Metalloid?	nonmetal	metal	metal	metal
Electron Configuration	$1s^1$	$1s^2 2s^1$	$1s^2 2s^2 2p^6 3s^1$	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$
# of Valence Electrons	1	1	1	1
Group Name		alkali metals	alkali metals	alkali metals
# of Energy Levels	1	2	3	4
# of Unpaired Electrons	1	1	1	1

Atoms - Challenge Level 10

MISSION 1. GATHER YOUR INTEL

2/4 could also be

B/Ca

C/K

Al/Mg

Si/Na

(smallest ⟶ largest)

Atom 1	<	Atom 2	<	Atom 3	<	Atom 4
Ne		Be		Li		Sc
# of Protons: 10 # of Electrons: 10		# of Protons: 4 # of Electrons: 4		# of Protons: 3 # of Electrons: 3		# of Protons: 21 # of Electrons: 21

MISSION 2. EXPOSE THE DETAILS

	Atom 1	Atom 2	Atom 3	Atom 4
Element Name	neon	beryllium	Lithium	scandium
Atomic Number	10	4	3	21
Average Atomic Mass	20.180	9.012	6.941	44.956
~~# of Neutrons~~	—	—	—	—
Metal, Nonmetal, Metalloid?	nonmetal	metal	metal	metal
Electron Configuration	$1s^2 2s^2 2p^6$	$1s^2 2s^2$	$1s^2 2s^1$	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^1$
# of Valence Electrons	8	2	1	2
Group Name	noble gases	alkaline earth metals	alkali metals	transition metals
# of Energy Levels	2	2	2	4
# of Unpaired Electrons	0	0	1	1

Atoms - Challenge Level 11

MISSION 1. GATHER YOUR INTEL

(smallest ⟶ largest)

Atom 1	<	Atom 2	<	Atom 3	<	Atom 4
Ar		Cl		S		Mg
# of Protons: 18 # of Electrons: 18		# of Protons: 17 # of Electrons: 17		# of Protons: 16 # of Electrons: 16		# of Protons: 12 # of Electrons: 12

MISSION 2. EXPOSE THE DETAILS

	Atom 1	Atom 2	Atom 3	Atom 4
Element Name	Argon	Chlorine	Sulfur	magnesium
Atomic Number	18	17	16	12
Average Atomic Mass	39.948	35.453	32.065	24.305
~~# of Neutrons~~	—	—	—	—
Metal, Nonmetal, Metalloid?	nonmetal	nonmetal	nonmetal	metal
Electron Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6$	$1s^2 2s^2 2p^6 3s^2 3p^5$	$1s^2 2s^2 2p^6 3s^2 3p^4$	$1s^2 2s^2 2p^6 3s^2$
# of Valence Electrons	8	7	6	2
Group Name	noble gases	halogens		alkaline earth metals
# of Energy Levels	3	3	3	3
# of Unpaired Electrons	0	1	0	0

Atoms - Challenge Level 12

MISSION 1. GATHER YOUR INTEL

2/3 could also be:

5/31
6/30
13/23
14/22
15/21
24/12
25/11
33/3

(smallest ⟶ largest)

Atom 1	<	Atom 2	<	Atom 3	<	Atom 4
N		Be		Ge		Ca
# of Protons: 7 # of Electrons: 7		# of Protons: 4 # of Electrons: 4		# of Protons: 32 # of Electrons: 32		# of Protons: 20 # of Electrons: 20

MISSION 2. EXPOSE THE DETAILS

	Atom 1	Atom 2	Atom 3	Atom 4
Element Name	nitrogen	Beryllium	germanium	Calcium
Atomic Number	7	4	32	20
Average Atomic Mass	14.007	9.012	72.64	40.078
~~# of Neutrons~~				
Metal, Nonmetal, Metalloid?	nonmetal	metal	metalloid	metal
Electron Configuration	$1s^2 2s^2 2p^3$	$1s^2 2s^2$	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^2$	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$
# of Valence Electrons	5	2	4	2
Group Name		alkaline earth metals		alkaline earth metals
# of Energy Levels	2	2	4	4
# of Unpaired Electrons	1	0	0	0

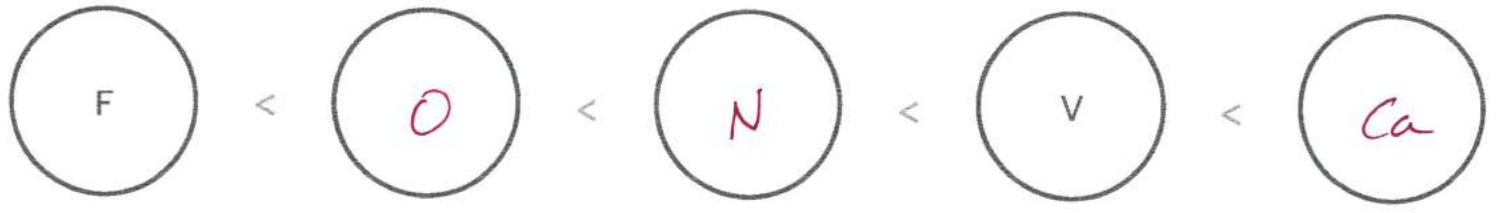
Atoms - Challenge Level 13

MISSION 1. GATHER YOUR INTEL

2/3/5 could also be:

8/6/21
8/5/22
7/6/22
3/12/20
13/3/19

(smallest ⟶ largest)



	Atom 1	Atom 2	Atom 3	Atom 4	Atom 5
# of Protons:	9	8	7	23	20
# of Electrons:	9	8	7	23	20

MISSION 2. EXPOSE THE DETAILS

	Atom 1	Atom 2	Atom 3	Atom 4	Atom 5
Element Name	Fluorine	Oxygen	nitrogen	Vanadium	Calcium
Atomic Number	9	8	7	23	20
Average Atomic Mass	18.998	15.999	14.007	50.9415	40.078
~~# of Neutrons~~					
Metal, Nonmetal, Metalloid?	nonmetal	nonmetal	nonmetal	metal	metal
Electron Configuration	$1s^2 2s^2 2p^5$	$1s^2 2s^2 2p^4$	$1s^2 2s^2 2p^3$	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^3$	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$
# of Valence Electrons	7	6	5	2	2
Group Name	halogen			transition metals	alkaline earth metals
# of Energy Levels	2	2	2	4	2
# of Unpaired Electrons	1	0	1	1	0