Station 1

Complete the following chart on your sheet:

Symbol	Charge	Protons	Neutrons	Electrons	Atomic #	Mass #
	+2		5		4	
$^{92}Zr^{2+}$						
	0	47				108
^{184}W				74		
	-3			10		14
Cr^{6+}	+6		28			

Station 1

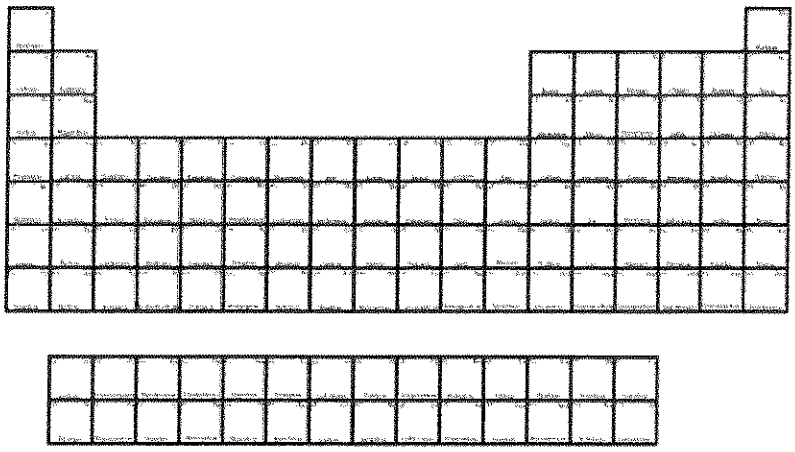
Complete the following chart on your sheet:

Symbol	Charge	Protons	Neutrons	Electrons	Atomic #	Mass #
$^{9}_{4}Be^{2+}$	+2	4	5	2	4	9
$^{92}Zr^{2+}$	2+	40	52	38	40	92
$^{108}_{47}Ag$	0	47	61	47	47	108
^{184}W	0	74	110	74	74	184
$^{14}_{7}N^{3-}$	-3	7	7	10	7	14
Cr^{6+}	+6	24	28	18	24	52

Station 2

Label the following groups on the periodic table:

- Noble gases
- Transition metals
- Metalloids
- Alkaline earth metals
- Halogens
- Inner transition metals (lanthanides and actinides)
- Alkali metals



Draw the line separating metals from non-metals. On which side are the metals? Non-metals?

Fill in on your own sheet

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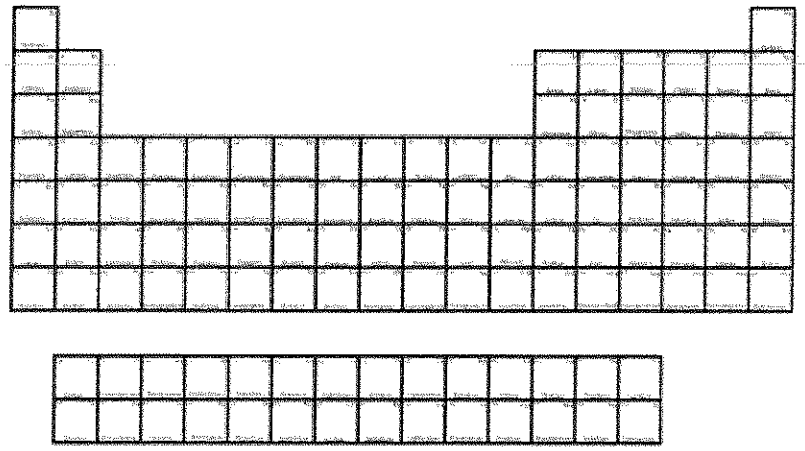

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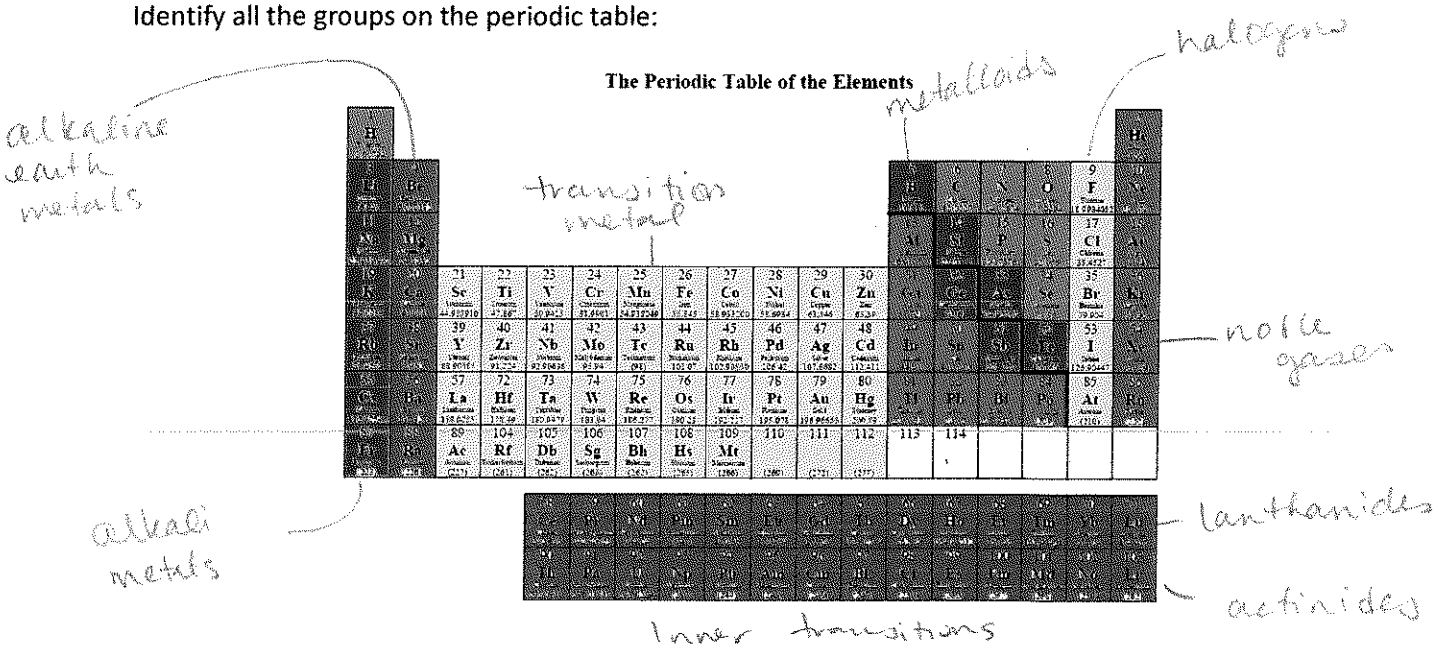
Fill in on your own sheet

Station 3

Identify all the groups on the periodic table:



left side of stair step = metals

Right side of stair step = non metals + H

Station 3

Write the FULL electron configurations for:

1. Molybdenum
2. Lead
3. Magnesium
4. Krypton

Write the short cut (using noble gases) electron configurations for:

5. Technetium
6. Iridium
7. Mendelevium
8. Bismuth

Station 3

Write the FULL electron configurations for:

1. Molybdenum $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2\ 3d^{10}\ 4p^6\ 5s^2\ 4d^4$
2. Lead $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2\ 3d^{10}\ 4p^6\ 5s^2\ 4d^{10}\ 5p^6\ 6s^2\ 5d^1\ 4f^{14}\ 5d^9\ 6p^2$
3. Magnesium $1s^2\ 2s^2\ 2p^6\ 3s^2$
4. Krypton $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2\ 3d^{10}\ 4p^6$

Write the short cut (using noble gases) electron configurations for:

5. Technetium $[Kr]\ 5s^2\ 4d^5$
6. Iridium $[Xe]\ 6s^2\ 5d^1\ 4f^{14}\ 5d^6$
7. Mendelevium $[Rn]\ 7s^2\ 6d^1\ 5f^{11}$
8. Bismuth $[Xe]\ 6s^2\ 5d^1\ 4f^{14}\ 5d^9\ 6p^3$

Station 4

How many valence electrons are in:

1. Gallium
2. Strontium
3. Iodine
4. Phosphorus
5. Rubidium
6. Xenon
7. Selenium
8. Carbon

Station 4

How many valence electrons are in:

1. Gallium 3
2. Strontium 2
3. Iodine 7
4. Phosphorus 5
5. Rubidium 1
6. Xenon 8
7. Selenium 6
8. Carbon 4

Station 5

Write equations for the following nuclear reactions:

1. Bismuth-214 undergoes alpha *and* gamma decay.

2. Krypton-87 emits a beta particle.

3. Boron-8 undergoes positron emission.

4. The nucleus of a curium-239 atom captures an electron.

Station 5

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3. Boron-8 undergoes positron emission.
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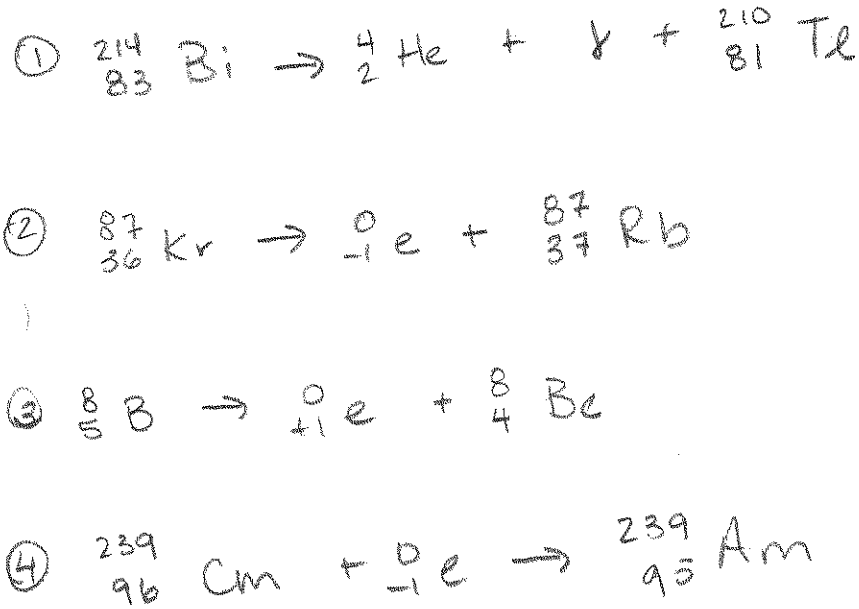

Station 6

1. A beaker is filled with 27.1 g of zinc-71. The half-life of zinc-71 is 2.45 minutes. After 17.2 minutes, how much of the sample is still zinc?

2. A sample of uranium-239 is left to decay over a period of 2.35 hours. If the half-life of U-239 is 23.45 minutes and 3.21 g of a sample remains, what was the original mass of the sample?

3. *Optional* Carbon dating is used to estimate the age of bones and artifacts. The half-life of carbon-14 is 5730 years. An average human contains 2.0×10^{-8} g of C-14. If an ancient mummy has 7.8×10^{-11} g of C-14, how old is the mummy?

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① $\frac{17.2\ min}{2.45\ min} = 7$ half lives

$\frac{27.1\ g}{27} = .212\ g$ OR $\frac{27.1\ g}{2} = \frac{}{2} = \frac{}{2} = \frac{}{2} = \frac{}{2}$

$= \frac{}{2} = \frac{}{2} = .212\ g$

② $\frac{2.35\ hr \mid 60\ min}{1\ hr} = 141\ min$

$\frac{141\ min}{23.45\ min} = 6$ half-lives

$3.21\ g \cdot 2^6 = 205\ g$

OR

$3.21\ g \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 = 205\ g$

③ $\frac{2.0 \cdot 10^{-8}\ g}{7.8 \cdot 10^{-11}\ g} = 2^x$ $x = 8$ half lives

$(5730\ yrs)8 = 45840\ yrs$

$= 45800\ yrs\ old$

OR

$\frac{2.0 \cdot 10^{-8}\ g}{2} = \frac{}{2} = \frac{}{2}$ keep going until you get to $7.8 \cdot 10^{-11}\ g$

then count how many times you divided (it should be 8)

Station 7

1. Complete this chart on your sheet.

Scientist	Describe atomic model	What are some of the key points in this atomic model?
Dalton		
Thomson		
Rutherford		
Bohr		
Schrödinger		

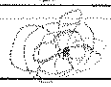
2. What sublevels can energy level 1 have? Energy level 2? 3? 4? 5?

3. How many different orbitals (boxes, orientations) can each sublevel have?

4. How many electrons can one orbital (box) contain?

Station 7

1. Complete this chart on your sheet.

Scientist	Describe atomic model	What are some of the key points in this atomic model?
Dalton	sphere	atoms indivisible can't change elements combine in whole #s
Thomson	(Plum pudding, e⁻ in muffin)	electrons were added to model
Rutherford		nucleus in center, e⁻ around
Bohr		planetary model - e⁻ in energy levels
Schrödinger		e⁻ cloud, energy levels have sublevels

2. What sublevels can energy level 1 have? Energy level 2? 3? 4? 5?

1s 2s,2p 3s,3p,3d 4s,4p,4d,4f 5s,5p,5d,5f

3. How many different orbitals (boxes, orientations) can each sublevel have?

S has one orbital (one box) P has 3 d has 5 f has 7

4. How many electrons can one orbital (box) contain?

2

(think back to filling in boxes w/ arrows