

Periodic TABLE KEY for CLASS Laboratory Activity

GROUP	1	2
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<b>Unknown #8</b>	
Atomic number	?
Physical State	gas
Density	0.0898 g/cm <sup>3</sup>
Melting Point	- 259.16°C
Color	colorless gas
Reactivity	very reactive
Period 1	
Electron per shell	1

<b>Li – Lithium</b>		<b>Be – Beryllium</b>	
Atomic number	3	Physical State	solid
Physical State	solid	Density	1.85 g/cm <sup>3</sup>
Density	0.534 g/cm <sup>3</sup>	Conductivity	excellent
Conductivity	good	Melting Point	1287°C
Melting Point	180°C	Color	gray
Color	silver	Reactivity	reactive
Reactivity	very reactive	Ionization energy	9.322
Period 2		Period 2	
Electron per shell	2, 1		

<b>Na – Sodium</b>		<b>Unknown #1</b>	
Atomic number	11	Atomic number	?
Physical State	solid	Physical State	solid
Density	0.971 g/cm <sup>3</sup>	Density	1.74 g/cm <sup>3</sup>
Conductivity	good	Conductivity	good
Melting Point	98°C	Melting Point	651°C
Color	silver	Color	silvery white
Reactivity	very reactive	Reactivity	reactive
Ionization energy	5.139	Ionization energy	7.646
		Electron per shell	2, 8, 2

<b>K – Potassium</b>		<b>Ca – Calcium</b>	
Atomic number	19	Atomic number	20
Density	0.86 g/cm <sup>3</sup>	Density	1.57 g/cm <sup>3</sup>
Conductivity	good	Conductivity	good
Melting Point	63°C	Melting Point	845°C
Color	silver	Color	silvery white
Reactivity	very reactive	Reactivity	reactive
Ionization energy		Ionization energy	6.113
Period 4		Period 4	
Electron per shell	2, 8, 8, 1		

<b>Unknown #3</b>		<b>Sr – Strontium</b>	
Atomic number	?	Atomic number	38
Physical State	solid - liquid	Physical State	solid
Density	1.53 g/cm <sup>3</sup>	Conductivity	good
Conductivity	good	Melting Point	769°C
Melting Point	39°C	Color	silvery white
Color	silvery white	Reactivity	reactive
Reactivity	very reactive	Ionization energy	5.695
Ionization energy	4.177	Group 2	
		Electron per shell	2, 8, 18, 8, 2

<b>Cs – Cesium</b>		<b>Ba – Barium</b>	
Atomic number	55	Atomic number	56
Physical State	solid	Physical State	solid
Density	1.87 g/cm <sup>3</sup>	Density	3.6 g/cm <sup>3</sup>
Conductivity	good	Conductivity	good
Melting Point	29°C	Melting Point	710°C
Color	silvery white	Color	silvery white
Reactivity	very reactive	Reactivity	reactive
Electron per shell	2, 8, 18, 18, 8, 1	Electron per shell	2, 8, 18, 18, 8, 2

<b>Fr - Francium</b>		<b>R – Radium</b>	
Atomic number	87	Atomic number	88
Physical State	gas	Physical State	solid
Density	2.9 g/cm <sup>3</sup>	Density	7.31 g/cm <sup>3</sup>
Conductivity	good	Conductivity	medium
Melting Point	30°C	Melting Point	157°C
Reactivity	very reactive	Color	silvery white
Electron per shell	2, 8, 18, 32, 18, 8, 1	Ionization energy	5.786
		Electrons per shell	2, 8, 18, 32, 18, 8, 2

3	4	5	6	7	8
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<b>Sc – Scandium</b>		<b>Ti – Titanium</b>		<b>V – Vanadium</b>		<b>Cr - Chromium</b>		<b>Mn – Manganese</b>		<b>Fe – Iron</b>	
Atomic number	21	Atomic number	22	Atomic number	23	Atomic number	24	Atomic number	25	Atomic number	26
Physical State	solid	Physical State	solid	Physical State	solid	Physical State	solid	Physical State	solid	Physical State	solid
Density	2.985 g/cm <sup>3</sup>	Density	4.506 g/cm <sup>3</sup>	Density	6.0 g/cm <sup>3</sup>	Density	7.19 g/cm <sup>3</sup>	Density	7.21 g/cm <sup>3</sup>	Density	7.8 g/cm <sup>3</sup>
Melting Point	1541°C	Melting Point	1668°C	Melting Point	1910°C	Melting Point	2180°C	Melting Point	1519°C	Melting Point	1538°C
Color	silvery – white	Color	silvery grey-white	Color	Blue-silver-grey-metallic	Color	silvery metallic	Color	silvery metallic	Color	lustrous metallic with a grayish tinge
Period 4		Period 4									

<b>Y - Yttrium</b>		<b>Zr – Zirconium</b>		<b>Nb – Niobium</b>		<b>Mo - Molybdenum</b>		<b>Tc – Technetium</b>		<b>Ru – Ruthenium</b>	
Atomic number	39	Atomic number	40	Atomic number	41	Atomic number	42	Atomic number	43	Atomic number	44
Physical State	solid	Physical State	solid	Physical State	solid	Physical State	solid	Physical State	solid	Physical State	solid
Density	4.472 g/cm <sup>3</sup>	Density	6.52 g/cm <sup>3</sup>	Density	8.57 g/cm <sup>3</sup>	Density	10.28 g/cm <sup>3</sup>	Density	11 g/cm <sup>3</sup>	Density	12.45 g/cm <sup>3</sup>
Melting Point	1526°C	Melting Point	1855°C	Melting Point	2477°C	Melting Point	2623°C	Melting Point	2157°C	Melting Point	2334°C
Color	silvery – white	Color	silvery – white	Color	grey - metallic bluish-when oxidized	Color	grey - metallic	Color	shiny gray metal	Color	silvery white metallic
Period 5		Period 5									

9	10
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<b>Co – Cobalt</b>		<b>Ni – Nickel</b>	
Atomic number	27	Atomic number	28
Physical State	solid	Physical State	solid
Density	8.9 g/cm <sup>3</sup>	Density	8.908 g/cm <sup>3</sup>
Melting Point	1495°C	Melting Point	1455°C
Color	hard lustrous bluish gray metal	Color	lustrous, metallic, and silver with a gold tinge

<b>Rh – Rhodium</b>		<b>Pd – Palladium</b>	
Atomic number	45	Atomic number	46
Physical State	solid	Physical State	solid
Density	12.41 g/cm <sup>3</sup>	Density	12.02 g/cm <sup>3</sup>
Melting Point	1964°C	Melting Point	1554.9°C
Color	silvery white metallic	Color	silvery white

1. Students assemble / build the below puzzle in class in teams at their laboratory table tops based on Atomic Number and prior knowledge of the Periodic Table
  2. They must then "puzzle piece" in the remaining unknown elements (in red) to complete the puzzle.
  3. To assure they have the proper element in the proper Group/ Family they must investigate more than simply Atomic #or Atomic Mass just as Dmitry Mendeleev once did to build their Periodic Table.
  4. Investigate and compare - Density, Melting Point, Color, Conductivity & Reactivity
  5. Finally, in laboratory write-up provide evidence for why they placed an unknown in a particular location.
- Burns 2017

							18
11	12	13	14	15	16	17	
							<b>He – Helium</b> Atomic number 2 Conductivity very poor Melting Point <b>-272°C</b> Color colorless Reactivity almost none Ionization energy <b>24.587</b> Electron per shell 2
<b>Cu – Copper</b> Atomic number 29 Physical State solid Density 8.96 g/cm <sup>3</sup> Melting Point 1084 °C Color red – orange Group 11	<b>Zn – Zinc</b> Atomic number 30 Physical State solid Density 7.14 g/cm <sup>3</sup> Melting Point 419.5 °C Color silver - gray Group 12	<b>B – Boron</b> Atomic number 5 Physical State solid Density 2.34 g/cm <sup>3</sup> Conductivity poor at r.t. Melting Point 2076°C Color brown Ionization energy 8.298	<b>C – Carbon</b> Atomic number 6 Physical State solid Density <b>2.10 g/cm<sup>3</sup></b> Conductivity good Melting Point 3550°C Color black Ionization energy <b>11.26</b>	<b>N – Nitrogen</b> Atomic number 7 Physical State gas Density 0.00125 g/cm <sup>3</sup> Conductivity <b>poor</b> Melting Point -210°C Color colorless Ionization energy <b>14.534</b>	<b>O – Oxygen</b> Atomic number 8 Physical State gas Density 0.0013 g/cm <sup>3</sup> Conductivity poor Melting Point -219°C Color colorless Reactivity reactive Ionization energy 13.618	<b>Unknown #2</b> Atomic number ? Physical State gas Density 0.00170 g/cm <sup>3</sup> Conductivity very poor Melting Point -219.6°C Color pale yellow Reactivity very reactive Ionization energy 17.422	<b>Ne – Neon</b> Atomic number 10 Conductivity very poor Melting Point <b>-249°C</b> Color colorless Reactivity almost none Ionization energy <b>21.564</b> Electron per shell 2, 8
<b>Ag – Silver</b> Atomic number 47 Physical State solid Density 10.49 g/cm <sup>3</sup> Melting Point 961.7 °C Color lustrous white metal Group 11	<b>Cd – Cadmium</b> Atomic number 48 Physical State solid Density 8.65 g/cm <sup>3</sup> Melting Point 321 °C Color silvery bluish-gray metallic Group 12	<b>Al – Aluminum</b> Atomic number 13 Physical State solid Density 2.7 g/cm <sup>3</sup> Conductivity medium Melting Point 303°C Color silvery white Ionization energy 5.986	<b>Si – Silicon</b> Atomic number 14 Physical State solid Density <b>2.33g/cm<sup>3</sup></b> Conductivity semi-conductor Melting Point 1410°C Color gray Ionization energy <b>8.151</b>	<b>P – Phosphorus</b> Atomic number 15 Physical State solid Density 1.823 g/cm <sup>3</sup> Conductivity <b>poor</b> Melting Point 44.2 °C Color white Ionization energy <b>10.486</b>	<b>Unknown #5</b> Atomic number ? Physical State solid Density 1.96 g/cm <sup>3</sup> Conductivity poor Melting Point 115 °C Color yellow Reactivity reactive Ionization energy 10.36	<b>Cl – Chlorine</b> Atomic number 17 Physical State gas Density 0.00321 g/cm <sup>3</sup> Conductivity very poor Melting Point -101°C Color greenish yellow Reactivity very reactive Ionization energy <b>12.967</b>	<b>Ar – Argon</b> Atomic number 18 Conductivity very poor Melting Point <b>-189.2°C</b> Color colorless Reactivity almost none Ionization energy <b>15.759</b> Electron per shell 2, 8, 8
		<b>Ga – Gallium</b> Atomic number 31 Physical State solid Density 5.904 g/cm <sup>3</sup> Conductivity medium Melting Point 30°C Color silvery Ionization energy 5.999	<b>Unknown #7</b> Atomic number ? Physical State solid Density 5.32 g/cm <sup>3</sup> Conductivity <b>semi-conductor</b> Melting Point <b>937°C</b> Color gray Ionization energy <b>7.899</b>	<b>As – Arsenic</b> Atomic number 33 Physical State solid Density 5.776 g/cm <sup>3</sup> Conductivity <b>poor</b> Melting Point 817 °C Color gray Ionization energy <b>9.81</b>	<b>Se – Selenium</b> Atomic number 34 Physical State solid Density 4.81 g/cm <sup>3</sup> Conductivity semi-conduct Melting Point 221°C Color gray/red/black Reactivity reactive Ionization energy <b>9.752</b>	<b>Br - Bromine</b> Atomic number 35 Physical State gas Density 3.12 g/cm <sup>3</sup> Conductivity very poor Melting Point -7.2°C Color reddish brown Reactivity very reactive Ionization energy <b>11.814</b>	<b>Unknown #4</b> Atomic number ? Physical State gas Conductivity very poor Melting Point <b>-156.6°C</b> Color colorless Reactivity almost none Ionization energy <b>13.999</b> Electron per shell 2, 8, 18, 8
		<b>In – Indium</b> Atomic number 49 Physical State solid Density 7.31 g/cm <sup>3</sup> Conductivity medium Melting Point 157°C Color silvery white Ionization energy 5.786 Group 13	<b>Sn – Tin</b> Atomic number 50 Physical State solid Density 7.31 g/cm <sup>3</sup> Conductivity good Melting Point 232°C Color silver Ionization energy 7.344	<b>Unknown #6</b> Atomic number ? Physical State solid Density 6.69 g/cm <sup>3</sup> Conductivity <b>semi-conductor</b> Melting Point <b>631 °C</b> Color bluish-white Ionization energy <b>8.641</b>	<b>Te - Tellurium</b> Atomic number 52 Physical State solid Density 6.24 g/cm <sup>3</sup> Conductivity semi-conduct Melting Point 450°C Color silvery gray Reactivity reactive Ionization energy <b>9.009</b>	<b>I – Iodine</b> Atomic number 53 Physical State solid Density 4.93 g/cm <sup>3</sup> Conductivity very poor Melting Point 113.5°C Color blue-black Reactivity very reactive Ionization energy <b>10.451</b>	<b>Xe - Xenon</b> Atomic number 54 Physical State gas Conductivity very poor Melting Point <b>-119.9°C</b> Color colorless Reactivity almost none Ionization energy <b>12.13</b> Electron per shell 2, 8,18,18, 8
		<b>Tl – Thallium</b> Atomic number 81 Physical State solid Density 11.85 g/cm <sup>3</sup> Conductivity good Melting Point <b>579°C</b> Color silvery white	<b>Pb – Lead</b> Atomic number 82 Physical State solid Density 11.34 g/cm <sup>3</sup> Conductivity good Melting Point 327°C Color blueish white				