

Name: **ANSWER KEY**

Date: _____



THE PERIODIC TABLE

PowerPoint Worksheet

INTRODUCING THE PERIODIC TABLE

1. What is the periodic table? It is the chart that organizes elements according to their increasing atomic numbers and their chemical and physical properties.
2. It was developed in 1869 by a man named Dmitri Mendeleev who was a Russian chemist and inventor.
3. In his time, there were only 60 elements discovered, but his periodic table predicted and left room for for the future discoveries of elements.

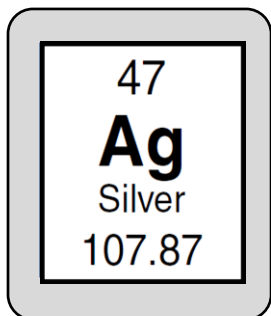
INFORMATION ON THE PERIODIC TABLE

4. Each element on the periodic table is represented within an element box which contains a few pieces of basic information.
5. Using the diagram below, label the information provided by the element box.

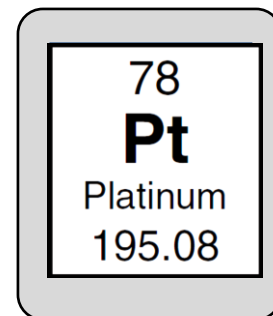
Diagram of an element box for Beryllium (Be) with labels:

- atomic number** (A whole number with no decimals.) → 4
- oxidation number** (It has a + or – sign.) → 2+
- element symbol** (Only the first letter is capitalized.) → Be
- element name** (Does not need to be capitalized.) → Beryllium
- atomic mass** (It is larger than the atomic number and always has decimals.) → 9.01

- b) Draw the element box for the element that has an atomic mass of 107.87.



- a) Draw the element box for the element that has the element symbol Pt.



ORGANIZATION OF THE PERIODIC TABLE

6. How is the periodic table arranged? **It is arranged in columns and rows.**

- ⇒ Each **column** on the periodic table is called a **group** and there are **18** of them.
- ⇒ Each **row** on the periodic table is called a **period** and there are **7** of them.

1	1A	1	2	13	14	15	16	17	18
1	H	2	He	3	4	5	6	7	8
1	Hydrogen	2	Helium	3	4	5	6	7	8
1	1.01	2	4.00	3	4	5	6	7	8
2	Li	Be	3	4	5	6	7	8	9
2	Lithium	Beryllium	3	4	5	6	7	8	9
2	6.94	9.01	3	4	5	6	7	8	9
3	Na	Mg	3	4	5	6	7	8	9
3	Sodium	Magnesium	3	4	5	6	7	8	9
3	22.99	24.31	3	4	5	6	7	8	9
4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co
4	Potassium	Calcium	Scandium	Titanium	Vanadium	Chromium	Manganese	Iron	Cobalt
4	39.10	40.08	44.96	47.87	50.94	52.00	54.94	55.85	58.93
5	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh
5	Rubidium	Strontium	Yttrium	Zirconium	Niobium	Molybdenum	Technetium	Ruthenium	Rhodium
5	85.47	87.62	88.91	91.22	92.91	95.94	(98)	101.07	102.91
6	Cs	Ba	La	Hf	Ta	W	Re	Os	Ir
6	Cesium	Barium	Lanthanum	Hafnium	Tantalum	Tungsten	Rhenium	Osmium	Iridium
6	132.91	137.33	138.91	178.49	180.95	183.84	186.21	190.23	192.22
7	Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt
7	Francium	Radium	Actinium	Rutherfordium	Dubnium	Seaborgium	Bohrium	Hassium	Meitnerium
7	(223)	(226)	(227)	(261)	(262)	(266)	(264)	(269)	(268)

7. There is a **zigzag** that separates the periodic table into two sides. This zigzag is also called the **staircase**.

- ⇒ To the **left** of the staircase you will find all the **metals**.
- ⇒ To the **right** of the staircase you will find all the **non-metals**, except for the element **hydrogen**, which is a **non-metal** found on the **left** side.

8. Directly to either side of the staircase you will find elements called **metalloids**. There are **8** of these elements.

METALS, NON-METALS AND METALLOIDS

9. Fill in the chart below to summarize the **metals**, **non-metals** and **metalloids**.

Type	State of Matter	Properties	Examples
Metals	<ul style="list-style-type: none"> All metals are solids at room temperature except for mercury which is a liquid. 	<ul style="list-style-type: none"> Many metals are lustrous, silvery in color, ductile, malleable, conductive and some are magnetic. 	copper mercury gold silver
Non-metals	<ul style="list-style-type: none"> Most non-metals are gases, except for bromine which is a liquid, and five non-metals are solids. These ones are: carbon, phosphorus, sulfur, selenium and iodine. 	<ul style="list-style-type: none"> Non-metal elements are either colorless or have various colors. They are not malleable, not ductile, brittle when solid, poor conductors and nonmagnetic. 	carbon oxygen nitrogen hydrogen sulfur iodine

10. What is a **chemical family**? Is a group (column) that contains elements with similar properties.

Group 1: Alkali Metals

Group 2: Alkaline Earth Metals

Groups 3-12: Transition Metals

Groups 13-16: Nonmetals

Groups 17: Halogens

Groups 18: Noble Gases

1 H Hydrogen 1.01	2 He Helium 4.00																																												
3 Li Lithium 6.94	4 Be Beryllium 9.01											5 B Boron 10.81	6 C Carbon 12.01	7 N Nitrogen 14.01	8 O Oxygen 16.00	9 F Fluorine 19.00	10 Ne Neon 20.18																												
11 Na Sodium 22.99	12 Mg Magnesium 24.31											13 Al Aluminum 26.98	14 Si Silicon 28.09	15 P Phosphorus 30.97	16 S Sulfur 32.07	17 Cl Chlorine 35.45	18 Ar Argon 39.95																												
19 K Potassium 39.10	20 Ca Calcium 40.08	21 Sc Scandium 44.96	22 Ti Titanium 47.87	23 V Vanadium 50.94	24 Cr Chromium 52.00	25 Mn Manganese 54.94	26 Fe Iron 55.85	27 Co Cobalt 58.93	28 Ni Nickel 58.69	29 Cu Copper 63.55	30 Zn Zinc 65.39	31 Ga Gallium 69.72	32 Ge Germanium 72.61	33 As Arsenic 74.92	34 Se Selenium 78.96	35 Br Bromine 79.90	36 Kr Krypton 83.80																												
37 Rb Rubidium 85.47	38 Sr Strontium 87.62	39 Y Yttrium 88.91	40 Zr Zirconium 91.22	41 Nb Niobium 92.91	42 Mo Molybdenum 95.94	43 Tc Technetium (98)	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.91	46 Pd Palladium 106.42	47 Ag Silver 107.87	48 Cd Cadmium 112.41	49 In Indium 114.82	50 Sn Tin 118.71	51 Sb Antimony 121.76	52 Te Tellurium 127.60	53 I Iodine 126.90	54 Xe Xenon 131.29																												
55 Cs Cesium 132.91	56 Ba Barium 137.33	57 La Lanthanum 138.91	72 Hf Hafnium 178.49	73 Ta Tantalum 180.95	74 W Tungsten 183.84	75 Re Rhenium 186.21	76 Os Osmium 190.23	77 Ir Iridium 192.22	78 Pt Platinum 195.08	79 Au Gold 196.97	80 Hg Mercury 200.59	81 Tl Thallium 204.38	82 Pb Lead 207.2	83 Bi Bismuth 208.98	84 Po Polonium (209)	85 At Astatine (210)	86 Rn Radon (222)																												
87 Fr Francium (223)	88 Ra Radium (226)	89 Ac Actinium (227)	104 Rf Rutherfordium (261)	105 Db Dubnium (262)	106 Sg Seaborgium (266)	107 Bh Bohrium (264)	108 Hs Hassium (269)	109 Mt Meitnerium (268)																																					
<table border="1"> <tbody> <tr> <td>58 Ce Cerium 140.12</td> <td>59 Pr Praseodymium 140.91</td> <td>60 Nd Neodymium 144.24</td> <td>61 Pm Promethium (145)</td> <td>62 Sm Samarium 150.36</td> <td>63 Eu Europium 151.96</td> <td>64 Gd Gadolinium 157.25</td> <td>65 Tb Terbium 158.93</td> <td>66 Dy Dysprosium 162.50</td> <td>67 Ho Holmium 164.93</td> <td>68 Er Erbium 167.26</td> <td>69 Tm Thulium 168.93</td> <td>70 Yb Ytterbium 173.05</td> <td>71 Lu Lutetium 174.97</td> </tr> <tr> <td>90 Th Thorium 232.04</td> <td>91 Pa Protactinium 231.04</td> <td>92 U Uranium 238.03</td> <td>93 Np Neptunium (237)</td> <td>94 Pu Plutonium (244)</td> <td>95 Am Americium (243)</td> <td>96 Cm Curium (247)</td> <td>97 Bk Berkelium (247)</td> <td>98 Cf Californium (251)</td> <td>99 Es Einsteinium (252)</td> <td>100 Fm Fermium (257)</td> <td>101 Md Mendelevium (258)</td> <td>102 No Nobelium (259)</td> <td>103 Lr Lawrencium (262)</td> </tr> </tbody> </table>																		58 Ce Cerium 140.12	59 Pr Praseodymium 140.91	60 Nd Neodymium 144.24	61 Pm Promethium (145)	62 Sm Samarium 150.36	63 Eu Europium 151.96	64 Gd Gadolinium 157.25	65 Tb Terbium 158.93	66 Dy Dysprosium 162.50	67 Ho Holmium 164.93	68 Er Erbium 167.26	69 Tm Thulium 168.93	70 Yb Ytterbium 173.05	71 Lu Lutetium 174.97	90 Th Thorium 232.04	91 Pa Protactinium 231.04	92 U Uranium 238.03	93 Np Neptunium (237)	94 Pu Plutonium (244)	95 Am Americium (243)	96 Cm Curium (247)	97 Bk Berkelium (247)	98 Cf Californium (251)	99 Es Einsteinium (252)	100 Fm Fermium (257)	101 Md Mendelevium (258)	102 No Nobelium (259)	103 Lr Lawrencium (262)
58 Ce Cerium 140.12	59 Pr Praseodymium 140.91	60 Nd Neodymium 144.24	61 Pm Promethium (145)	62 Sm Samarium 150.36	63 Eu Europium 151.96	64 Gd Gadolinium 157.25	65 Tb Terbium 158.93	66 Dy Dysprosium 162.50	67 Ho Holmium 164.93	68 Er Erbium 167.26	69 Tm Thulium 168.93	70 Yb Ytterbium 173.05	71 Lu Lutetium 174.97																																
90 Th Thorium 232.04	91 Pa Protactinium 231.04	92 U Uranium 238.03	93 Np Neptunium (237)	94 Pu Plutonium (244)	95 Am Americium (243)	96 Cm Curium (247)	97 Bk Berkelium (247)	98 Cf Californium (251)	99 Es Einsteinium (252)	100 Fm Fermium (257)	101 Md Mendelevium (258)	102 No Nobelium (259)	103 Lr Lawrencium (262)																																

Actinides: Elements 89-103

12. Fill in the chart to **summarize** information on the important categories of elements on the periodic table.

Name of Group	Group #	Elements in Group	Description of Properties and Facts
Alkali Metals	1	Li Na K Rb Cs Fr	<ul style="list-style-type: none"> This group of elements are all <u>soft</u> and <u>silver</u>-colored <u>solids</u>. They are the <u>most</u> reactive of all the metals because they only have <u>one</u> valence electron. <ul style="list-style-type: none"> ⇒ They each very readily <u>bond</u> with other elements by <u>transferring</u> their valence electron to each become a stable <u>ion</u>, meaning they have a <u>full</u> outer orbital. ⇒ The bond between the ions creates a <u>new</u> substance called a <u>compound</u>. They are all reactive with <u>water</u>. To prevent contact with <u>water vapor</u> in the air, they are stored in <u>mineral oil</u>. Elements get <u>more</u> reactive as you go <u>down</u> the group. <ul style="list-style-type: none"> ⇒ <u>Francium</u> is the most reactive....and it's <u>radioactive</u>.
Alkaline Earth Metals	2	Be Mg Ca Sr Ba Ra	<ul style="list-style-type: none"> These elements are also all <u>silver</u>-colored <u>solids</u>. They are also reactive with <u>water</u> but <u>less</u> so than group 1 elements. <ul style="list-style-type: none"> ⇒ They each have <u>two</u> valence electrons. ⇒ Similar to group 1 elements, they readily bond with other elements. However, in this case, they transfer their <u>two</u> valence electrons to become stable ions with full outer orbitals. Elements get <u>more</u> reactive as you go <u>down</u> the group. <ul style="list-style-type: none"> ⇒ <u>Radium</u> is the most reactive....and it's also <u>radioactive</u>.
Halogens	17	F Cl Br I At	<ul style="list-style-type: none"> This group of elements are all <u>non-metals</u> and are found in all <u>three</u> states. They are the <u>most</u> reactive of the non-metals because they have <u>seven</u> valence electrons. <ul style="list-style-type: none"> ⇒ 1 electron short of a full outer orbital. ⇒ They readily combine with other elements to <u>take one</u> valence electron from them to become stable ions (with full outer shells). Halogens become more reactive as you move <u>up</u> the group. <ul style="list-style-type: none"> ⇒ <u>Fluorine</u> is the most reactive.

Name of Group	Group #	Elements in this Group	Description of Properties and Facts
Noble Gases	18	He Ne Ar Kr Xe Rn	<ul style="list-style-type: none"> These non-metal elements are <u>non-reactive</u> gases. They <u>do not</u> bond with other elements because they have <u>full</u> outer orbitals. Since they don't react with other elements, they <u>do not</u> form <u>compounds</u>. <p>⇒ Noble gases are also described as <u>inert gases</u>.</p>
Transition Metals	3-12	copper iron gold mercury platinum silver	<ul style="list-style-type: none"> These groups contain metals that have the usual properties of metals. (<i>Lustrous, malleable, ductile, electrically conductive etc.</i>) These metals are found in the solid state except for <u>mercury</u> which is a <u>liquid</u> at room temperature.
Lanthanides	N/A	57-71	<ul style="list-style-type: none"> They are all <u>metals</u> that have been misleadingly labeled "<u>rare earth metals</u>" in the past.
Actinides	N/A	89-103	<ul style="list-style-type: none"> They are <u>metals</u> that are <u>radioactive</u>. They will spontaneously <u>combust</u> in the air.



Created by Anh-Thi Tang – Tangstar Science

Copyright © 2015 Anh-Thi Tang (a.k.a. Tangstar Science)

All rights reserved by author.

TERMS OF USE: This document is for personal use only and may only be used by the original purchaser. Copying for more than one teacher, classroom, department, school, or school district is prohibited. Additional licenses can be purchased at a discount for others to use in your department. This entire document, or any parts within, may not be reproduced or displayed for public viewing. You may NOT electronically post this product online including to teacher blogs, classroom websites or school networks. Failure to comply is a copyright infringement and a violation of the Digital Millennium Copyright Act (DMCA).

<http://www.teacherspayteachers.com/Store/Tangstar-Science>