# SI Chemistry - Full Discipline Demo

#### Introduction to the Periodic Table

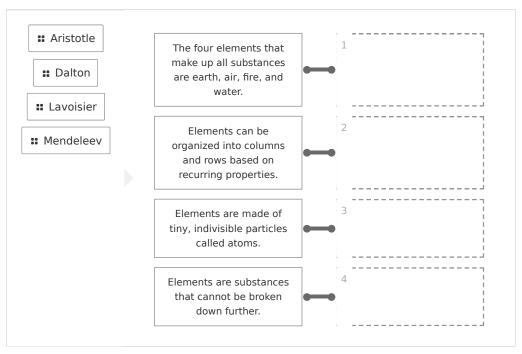
## Final Report - Answer Guide

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**Instructor** Sales SI Demo

### Test Your Knowledge

#### Match the scientist with his contribution to chemistry.



#### Correct answers:

1 Aristotle 2 Mendeleev 3 Dalton 4 Lavoisier



#### Categorize each statement as true or false.

# Elements in vertical columns have different properties	es.
# Metalloids are also known as semimetals.	
: The horizontal rows on the periodic table are called gro	oups.
: The majority of the elements on the periodic table are nor	nmetals.
** The periodic table arranges elements according to atomic number	er, not weight.
:: The vertical columns are known as groups.	
True False	
True False	

#### Correct answers:

1

The periodic table arranges elements according to atomic number, not weight.

The vertical columns are known as groups.

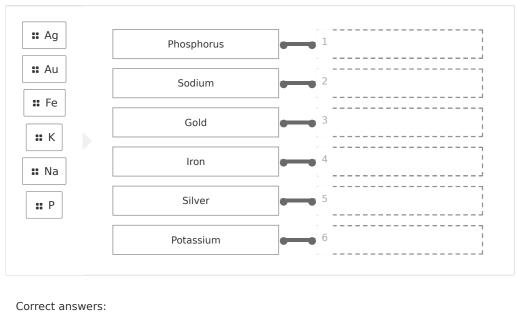
Metalloids are also known as semimetals.

2 Elements in vertical columns have different properties.

The horizontal rows on the periodic table are called groups.

The majority of the elements on the periodic table are nonmetals.

#### Match each symbol to the correct element.



1 P 2 Na 3 Au 4 Fe 5 Ag 6 K

## **Exploration**

Hindu philosophers

The idea that the four basic substances, or elements, are earth, air, fire, and water was proposed by \_\_\_\_\_.

<ul> <li>the ancient Egyptians</li> </ul>		
alchemists in the Middle Ages		
<ul> <li>the ancient Greeks</li> </ul>		
<ul> <li>stone-age humans</li> </ul>		

Scientists discovered that elements sharing similar properties also have atoms containing a similar arrangement of electrons.

True			
<ul><li>False</li></ul>			



he s	side of t	he period	periodic ta ic table.		
					<b>~</b>
nt sodium	n is				
					~
e different	t types (	of elemen	ts (metals	, nonmet	als,
oom tempe	erature a	nd exhibit	properties	such as:	aood
uids or gas . As solids, points and s that cond iconductors es and mel	ny surfac ses at roo nonmet densitie duct hea rs). They	es, mallea om temper als tend to ss. t and elect tend to be	rature and a be brittle a cricity only shiny and	, high me are typica and have under ver somewha	lting illy dull Ty at
etalloids ai you condu					ore like in Data Tabl
-	you comu	you conducted un	you conducted and the init	you conducted and the information is	you conducted and the information recorded

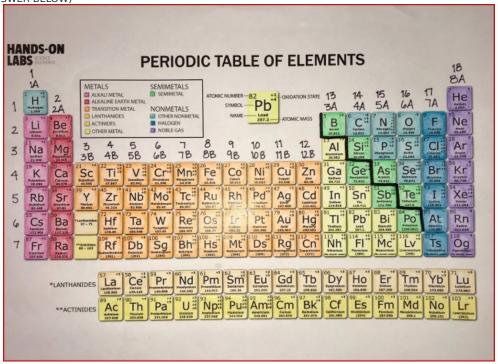


Metalloids have characteristics of both metals and nonmetals. They are typically shiny solids at room temperature and can be malleable like metals but some are brittle like the nonmetal solids. They are neither conductors nor insulators but semiconductors. Their densities lie in between the high-density metals and the low-density nonmetals.

#### Define the term "transition." How does this definition apply to the transition metals?

The word, transition, indicates a change between circumstances or phases. In the case of the periodic table, the transition elements are between the metals and nonmetals. We might predict that the elements become less metallic in their properties going across the periodic table toward the nonmetal elements.

Photo 1: Completed Periodic Table (SAMPLE ANSWER BELOW)



Data Table 1: Physical and Chemical Properties of Elements (SAMPLE ANSWER BELOW)

(SAMILE ANS	MEK BELOM)					
Group	Ductile/ Malleable	Conductivity	Melting & Boiling Points	Presence in the Environment	Reactivity	Electron Behavior
Alkali Metal - Na	Ductile and malleable	Good conductor of heat and electricity	Low melting and boiling points compared to other metals	Does not occur uncombined in nature	Highly reactive	Readily loses the 1 electron in its outer shell
Alkaline Earth Metal - Mg	Ductile and malleable	Good conductor of heat and electricity	High melting and boiling points	Does not occur uncombined in nature	Highly reactive	Loses electrons in reactions
Transition Metal - Fe	Ductile and malleable	Good conductor of heat and electricity	High melting and boiling points	Does not occur uncombined in nature	Highly reactive	Loses electrons and exhibits more than 1 oxidation state
Metalloids - Ge	Usually ductile and malleable	Semiconductor of heat and electricity	High melting and boiling points	Does not occur uncombined in nature	Intermediate reactivity	Can lose or gain electrons in reactions
Halogen - Cl	Not ductile or malleable	Poor conductor of heat and electricity	Low melting and boiling points	Does not occur uncombined in nature	Very reactive	Readily gains electrons
Noble gas - Ar	Not ductile or malleable	Poor conductor of heat and electricity	Low melting and boiling points	Occurs uncombined in nature	Unreactive	Has a complete valence electron shell so little tendency to



				gain or lose electrons
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# Data Table 2: Element Groups and Descriptions (SAMPLE ANSWER BELOW)

(SAMITEL ANSWE	I DELOW,			
Element	Group Name	Group Number	Metal/ Nonmetal/ Metalloid	Description
Neon	Noble gas	18	Nonmetal	Colorless, tasteless, and odorless gas, unreactive, nonconductive
Bromine	Halogen	17	Nonmetal	Not found as a free element (uncombined) in nature, reddishbrown liquid that vaporizes readily at room temperature to a red gas with a strong disagreeable odor
Beryllium	Alkaline earth metal	2	Metal	Silvery white, relatively soft, low density, conductive solid that is not found as a free element in nature but commonly found combined in alloys with copper or nickel
Platinum	Transition metal	10	Metal	Slivery-white, ductile, malleable, conductive solid with a high melting point for this type of element
Potassium	Alkali metal	1	Metal	Soft, easily cut with a knife to expose a silvery surface that rapidly oxidizes in air, never found uncombined in nature
Silicon	Semimetal	14	Metalloid	Metallic luster and grayish solid, very common in rocks and gemstones such as amethyst and opal, semiconductor
Sulfur	Nonmetal	16	Nonmetal	Pale yellow, odorless, brittle solid at room temperature, nonconductor

## **Competency Review**

0	found that elements could be organized into columns and rows bas on recurring properties.	ed
	Antoine de Lavoisier	
	John Dalton	
	O Dimitri Mendeleev	~
	<ul><li>Aristotle</li></ul>	

The known elements were organized into fo	our categories (gases,
onnmetals, metals, and earths) by  Antoine de Lavoisier	<b>~</b>
John Dalton	·
Dimitri Mendeleev	
<ul><li>Aristotle</li></ul>	
Today's periodic table organizes elements k	у
atomic weight	
atomic number	<b>✓</b>
o atomic mass	
time of discovery	
The include the elements in group 1 or	the periodic table.
alkaline earth metals	
alkali metals	<b>~</b>
transition metals	
oprimary metals	
The atomic number represents the number atom of the element.	of protons and neutrons in one
○ True	



have low melting and boiling points compared to other metals.	
Alkaline earth metals	
Alkali metals	✓
<ul> <li>Transition metals</li> </ul>	
Primary metals	
are highly reactive nonmetals that form strongly acidic compounds with hydrogen.	3
Alkaline earth metals	
<ul> <li>Noble gases</li> </ul>	
<ul> <li>Metalloids</li> </ul>	
<ul><li>Halogens</li></ul>	<b>~</b>
Electricity and heat travel more easily through metals than metalloids.	
○ True	<b>✓</b>
False	
Magnesium is a silvery-white, low density, reasonably strong element the will tarnish in air to form a thin oxide coating. Based on these characteristics, magnesium is a	nat
metal	<b>✓</b>
<ul><li>metalloid</li></ul>	
<ul><li>nonmetal</li></ul>	



like sodium. Based on these characteristics, astatine is a(n)	
alkaline earth metal	
<ul><li>transition metal</li></ul>	
halogen	<b>~</b>
o noble gas	