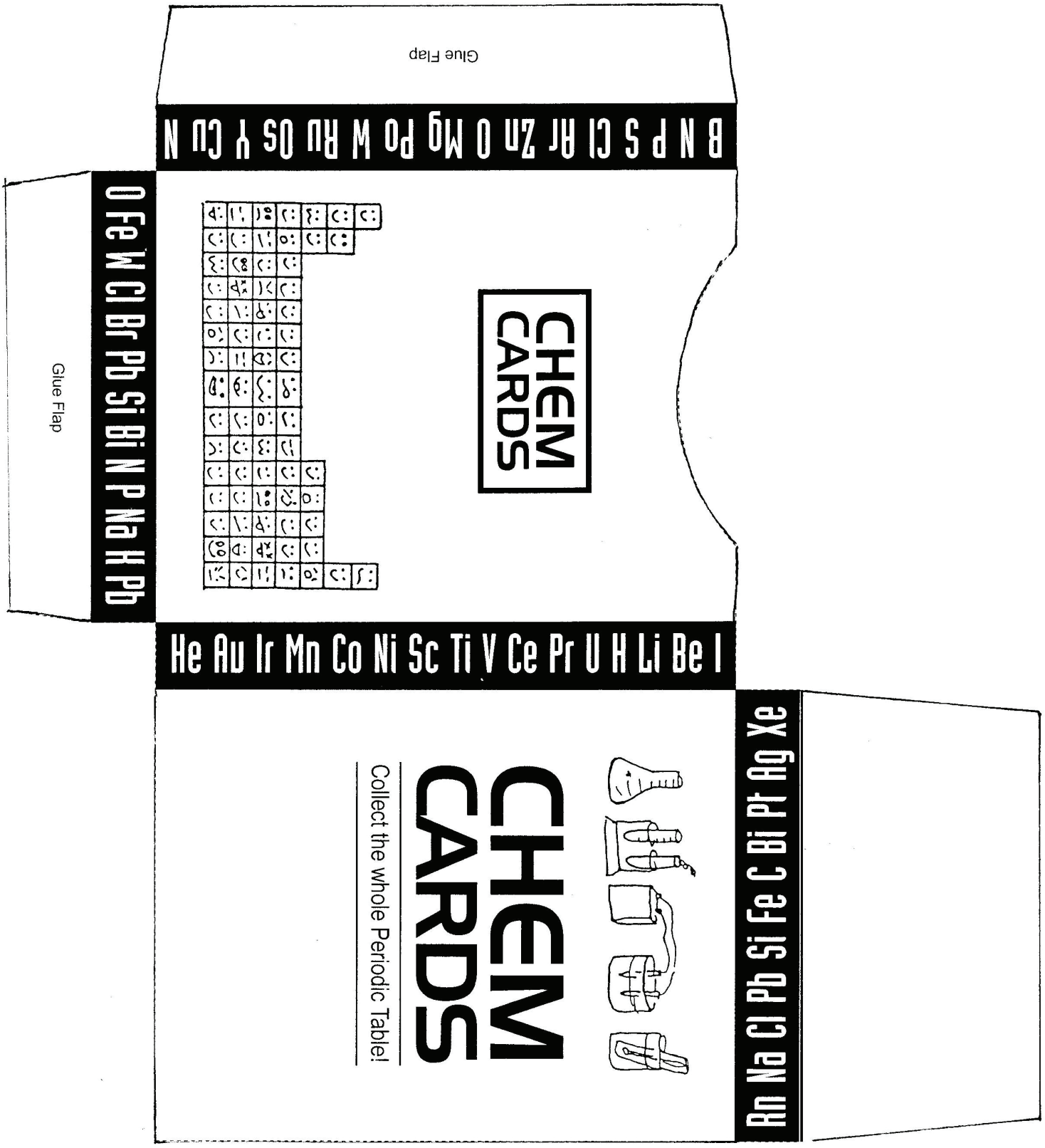
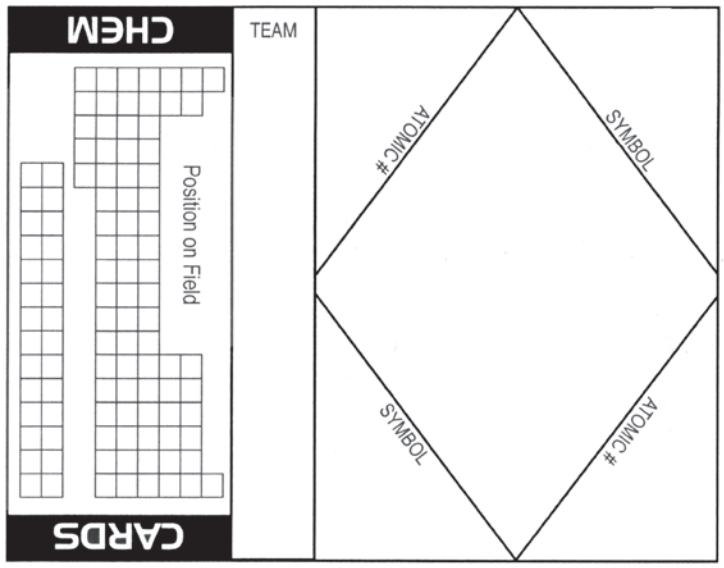
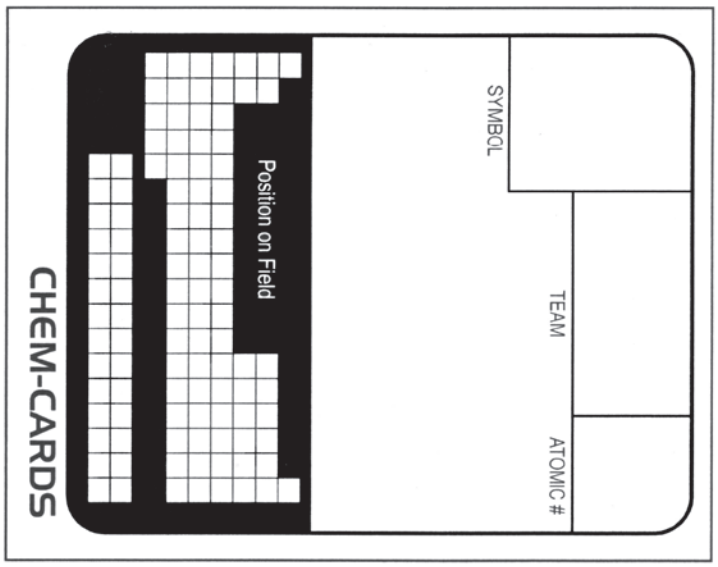
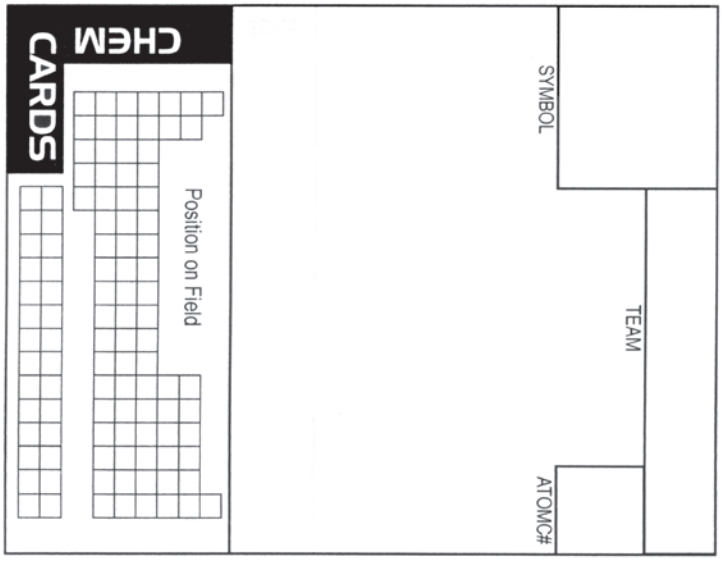
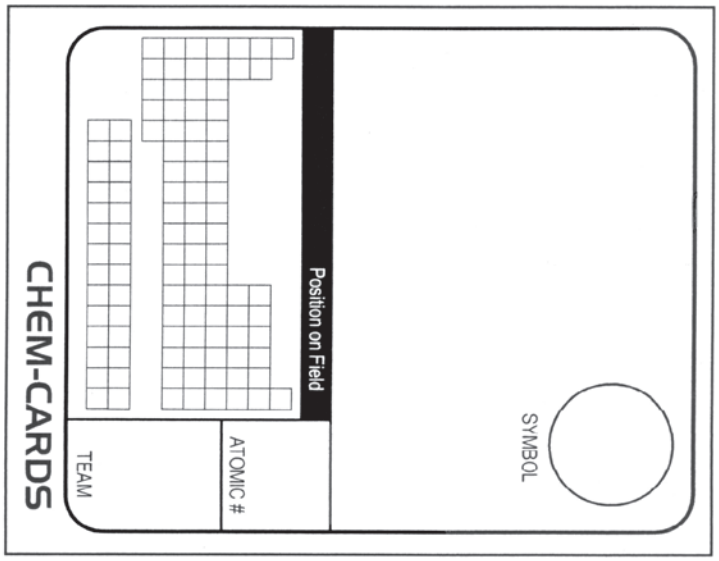


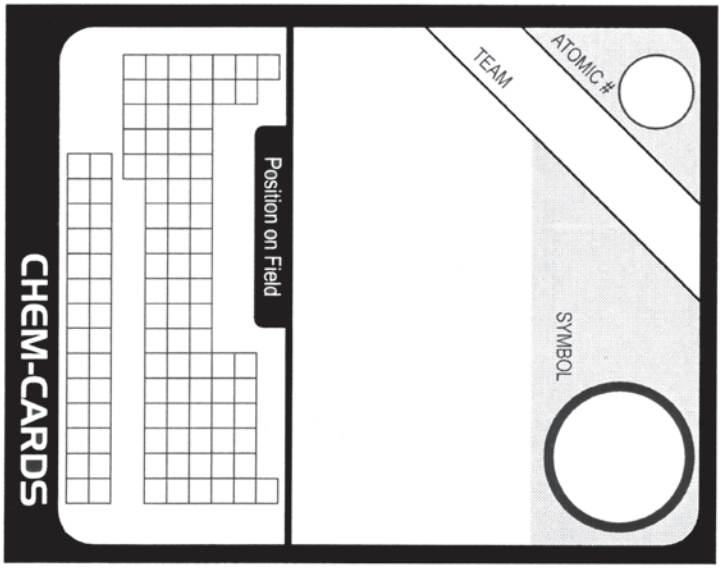
Holder for trading cards. Copy one per student onto heavy card stock (any color).

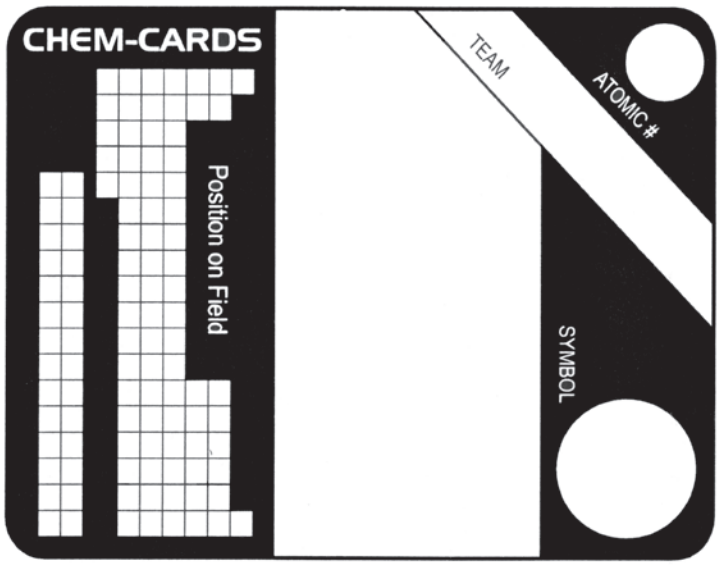












Pattern for trading cards

Copy onto white card stock.

Copy this onto the reverse side of cards.

_____
name of element

_____ _____ _____
symbol atomic # weight

Interesting facts:

Card designed by: _____
your name

_____
name of element

_____ _____ _____
symbol atomic # weight

Interesting facts:

Card designed by: _____
your name

_____
name of element

_____ _____ _____
symbol atomic # weight

Interesting facts:

Card designed by: _____
your name

_____
name of element

_____ _____ _____
symbol atomic # weight

Interesting facts:

Card designed by: _____
your name

_____
name of element

_____ _____ _____
symbol atomic # weight

Interesting facts:

Card designed by: _____
your name

_____
name of element

_____ _____ _____
symbol atomic # weight

Interesting facts:

Card designed by: _____
your name

symbol

name of element

atomic mass

number of protons

number of neutrons

number of electrons

atomic number

At standard temperature and pressure (STP), this element is a:

- ☐ solid
- ☐ liquid
- ☐ gas

Where did this element get its name?

At what temperature will this element boil?

At what temperature will this element melt or freeze?

What group does this element belong to?

- ☐ alkali metals
- ☐ alkali earth metals
- ☐ transition metals
- ☐ true metals
- ☐ semi-metals (metalloids)
- ☐ non-metals

Is this element found in the Earth's crust? ☐ yes ☐ no
If so, where?

☐ rocks ☐ dirt ☐ lava
☐ water ☐ gemstones
☐ sand ☐ _____

When was this element first discovered?

Who discovered it?

Is this element ever found all by itself (not part of a compound)? ☐ yes ☐ no

What color is this element? (Or, if it is never found by itself, what color is its most common compound?)

Other colors?

Is this element used in industry? ☐ yes ☐ no
If so, what is it used for?

Is this element found in the human body? ☐ yes ☐ no
Is it part of the structure of the body? ☐ yes ☐ no
Can this element be harmful to the body? ☐ yes ☐ no
If it is harmful, how might you ingest it or come into contact with it?

Is this element used in any art or craft? ☐ yes ☐ no
What type of art uses it?

☐ painting ☐ sculpture ☐ pottery
☐ printing ☐ coins ☐ jewelry
☐ _____

Is this element used in medicine or dentistry? ☐ yes ☐ no
If so, how is it used?

Give one historical fact about this element other than the date of its discovery:

What do you think is the most interesting fact about this element?

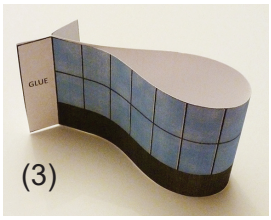
Draw a picture of a molecule containing this element:

Name of molecule:

Can you use these shapes to make a Periodic Table?

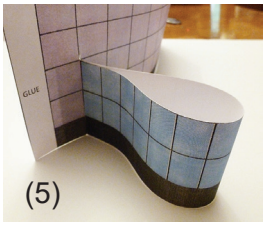
1) Write the atomic symbols and atomic numbers of the elements on the squares. The word "GLUE" should be right-side up as you work. In other words, you can use the word GLUE as your guide to make sure you don't have the rectangles upside down.

2) Cut out all three rectangles.



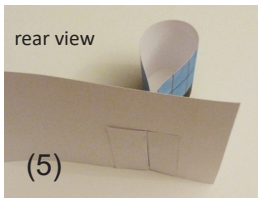
3) Fold the thinnest one into a loop and fold the end flaps back.

4) Cut the red line on the purple rectangle. You might want to trim out the whole red line (a strip about a millimeter wide) so that the fit won't be too tight when you insert the looped piece. (In other words, you want the red color to be completely gone.)



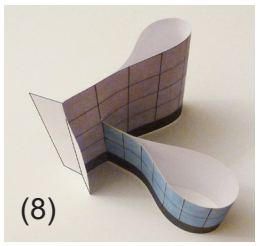
5) Insert the loop and glue in place.

6) Now make the purple rectangle into a loop, glue the end and fold back the flaps (the same thing you did to the first piece).

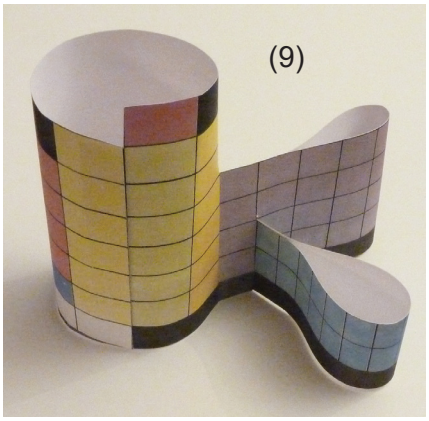


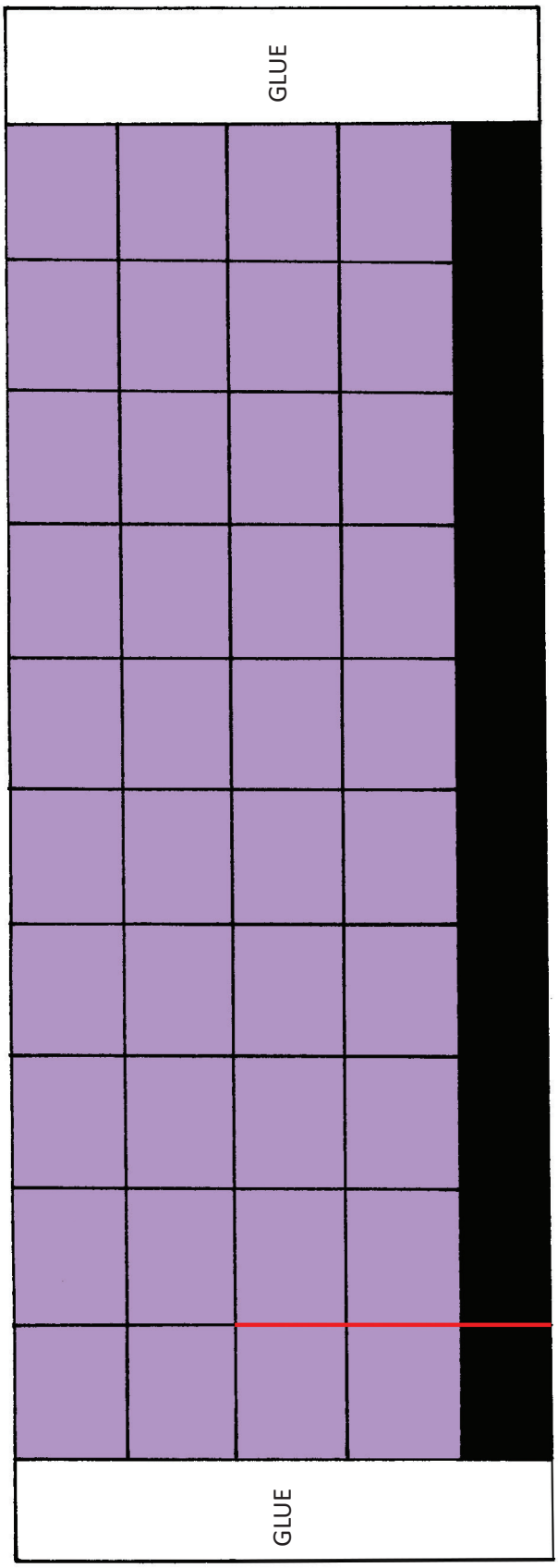
7) Cut the red line on the large rectangle. Trim out the whole red line (about a millimeter wide strip) to give enough space to insert the purple piece.

8) Insert the purple loop and glue in place.



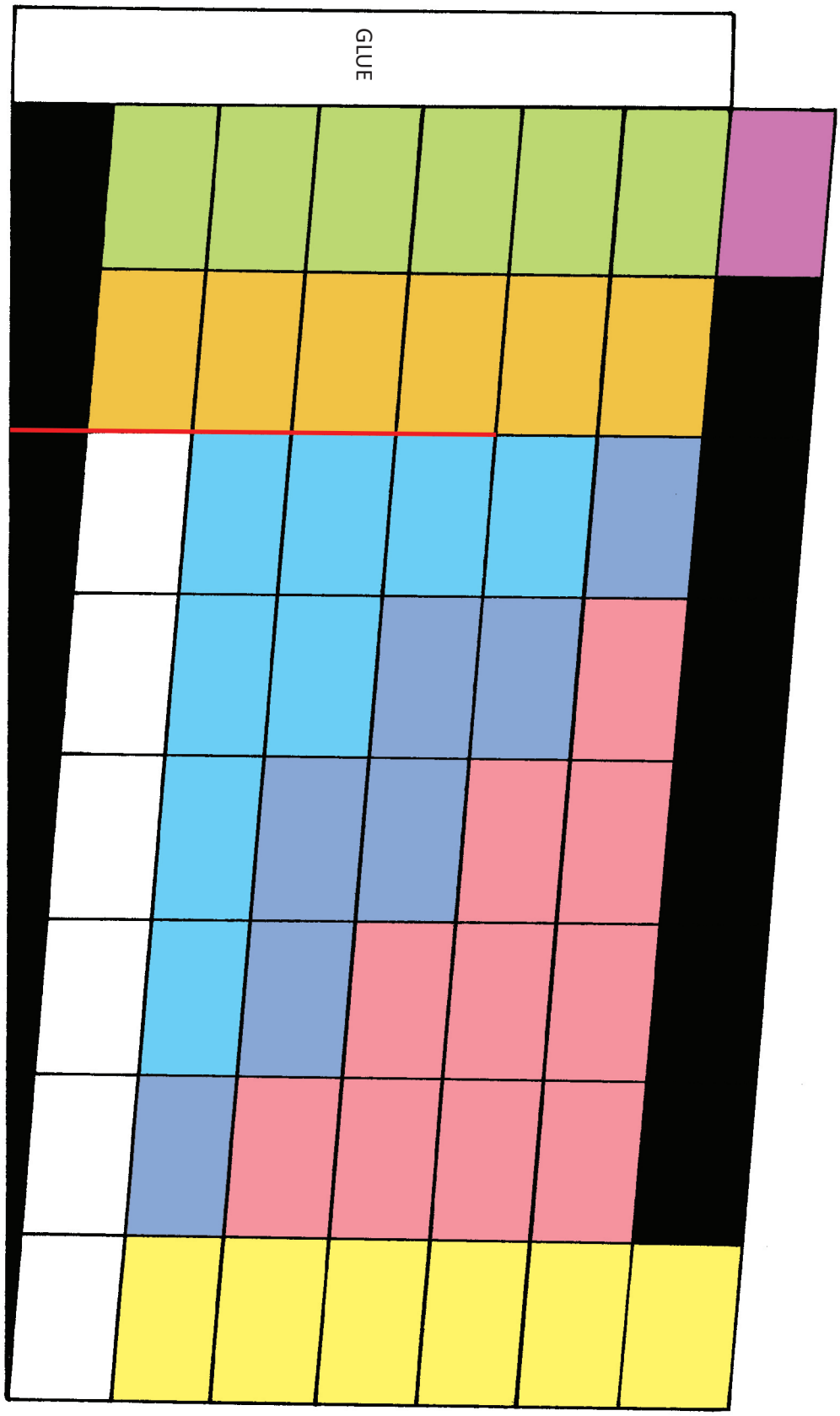
9) Bend the large rectangle into a cylinder and secure with glue on glue tab.

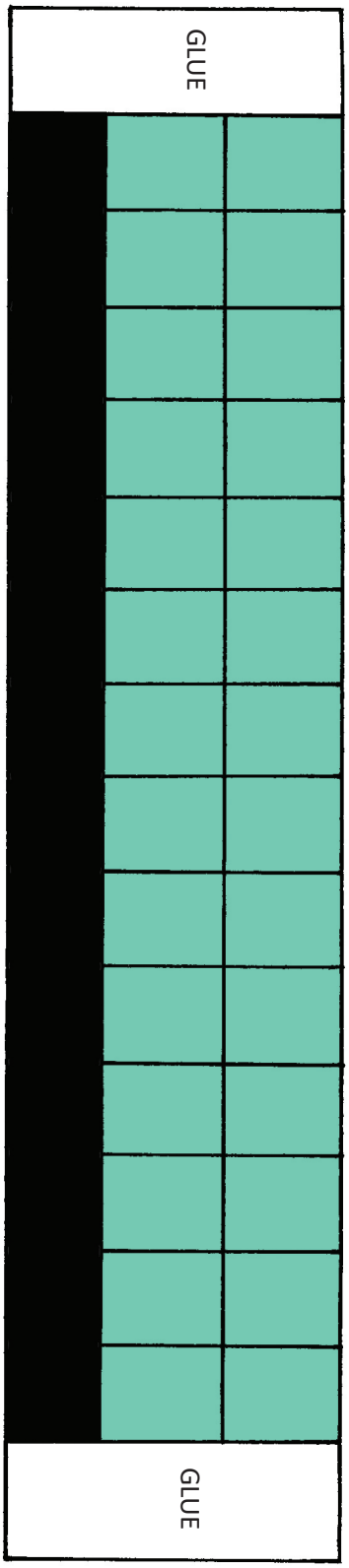




These patterns were developed completely from scratch by Ellen McHenry and have no connection to the official Alexander Arrangement. To see (or to purchase) the official model of Alexander's arrangement, visit allperiodictables.com.

COPY THIS PAGE ONTO CARD STOCK





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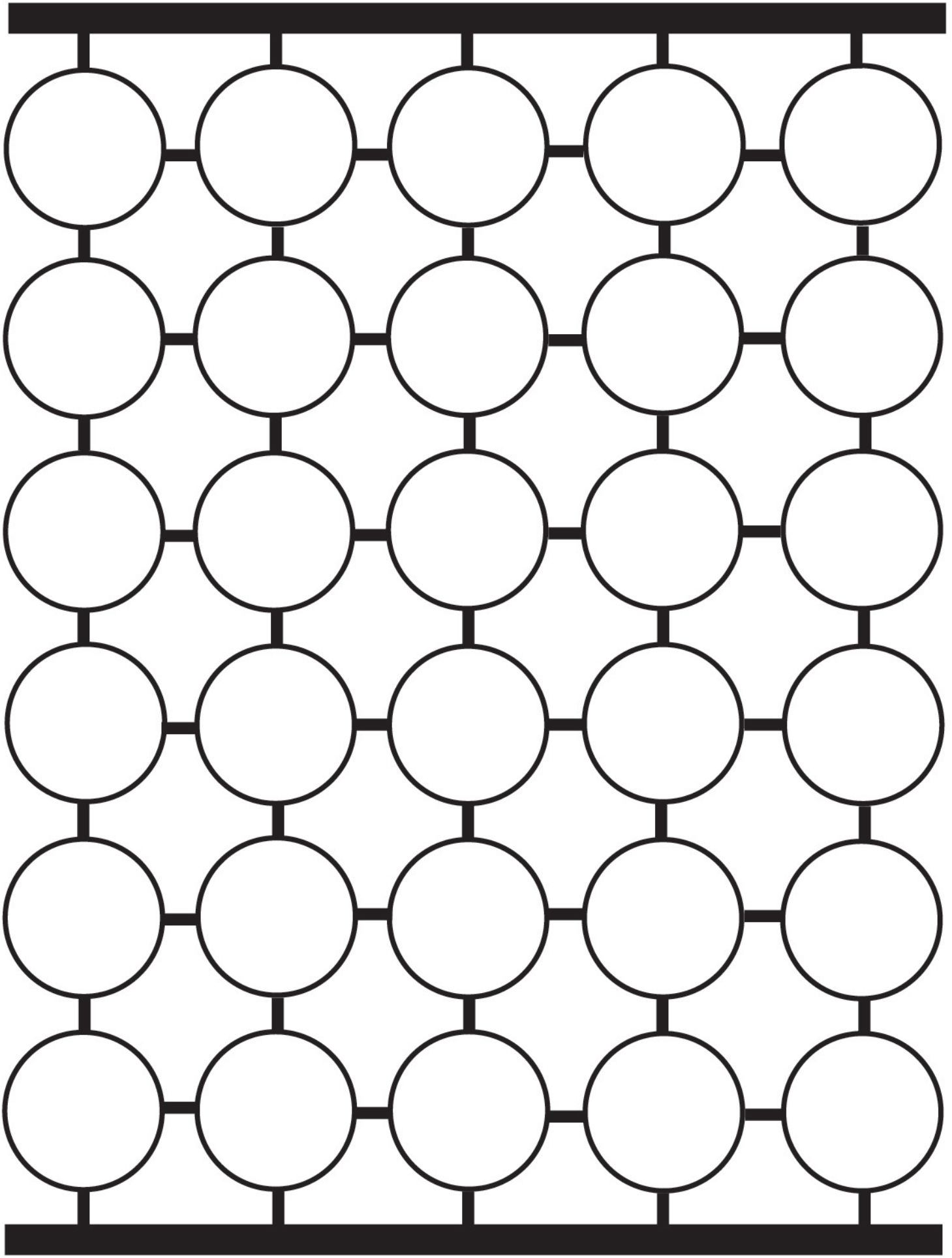


Welcome! I am detective "Sheerluck" Holmium. Both of these names are actually nicknames. My friends call me Holmium because they say my moustache reminds them of a sample of pure holmium metal, and they call me "Sheer-luck" just to tease me. It's not sheer luck when I solve a case! I use facts and logical reasoning-- I don't need luck! Sometimes silly nicknames stick whether you like it or not.

I hear that you'd like to be part of my detective agency. The first thing you have to do solve my Periodic Mystery puzzles. You will be given clues by my consultants. Use these clues to eliminate wrong choices. Eventually there will be only one element left. Let's hope that's the answer I am looking for!

GAME 1: **He, Be, O, Tc, Hg**

GAME 2: **C, Si, K, Ge, Sn**

GAME 3: **S, Ca, V, Fe, Br, Kr**

GAME 4: **Na, Cl, Ar, Ga, As, Au**

GAME 5: **Li, F, Ne, Xe, Bi, Po**

GAME 6: **P, Zr, I, Ba, Ir, Tl, Pb**

GAME 7: **Mg, Zn, Se, Ag, Sb, Cs, Rn, Pu**

GAME 8: **He, N, F, K, Ca, Fe, Mn, Ni**

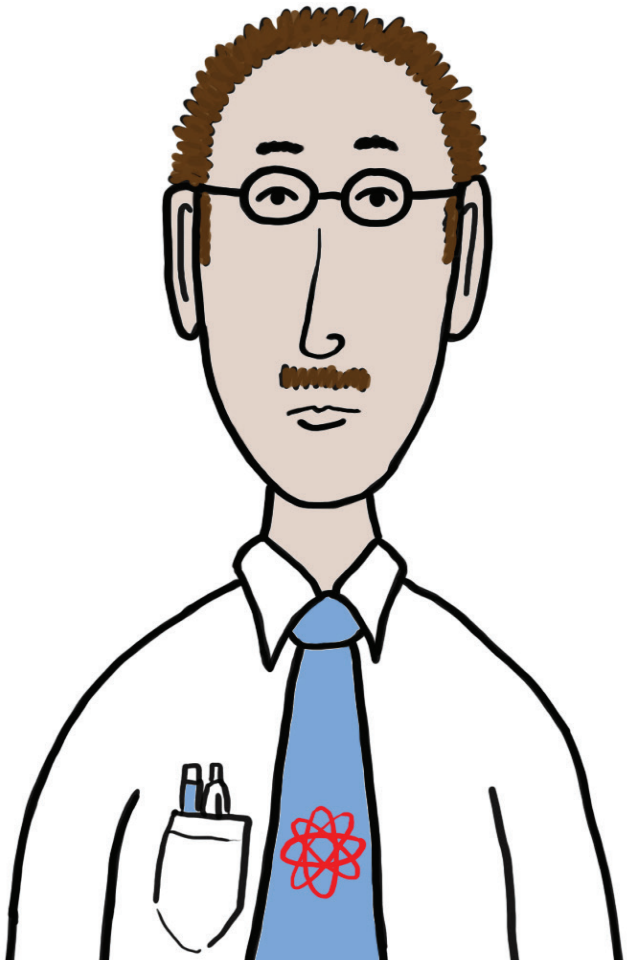
GAME 9: **O, Na, S, Cl, Ar, Cu, Rb, Y, Sn, Pb**

GAME 10: **B, Mg, V, Ga, Ge, Br, Nb, I, Xe, Ta**

GAME 11: **Ne, P, Cr, As, Kr, Ru, Rh, Ag, In, Pm**

GAME 12: **H, Al, Si, Co, Sr, Mo, Sb, Te, Tl, U**


History of
Chemistry



Game 1 Doctor It is not an element that is needed by tby human body.	Game 2 Doctor This element is generally not found in mammals.
Game 1 Chemist It is not a liquid at room temperature.	Game 2 Chemist It would be hard for me to melt this element in my crucible.
Game 1 Physicist The most common forms of this element are not radioactive.	Game 2 Physicist Atoms of this element have a valency of 4.
Game 1 Historian It was not discovered with a spectrometer.	Game 2 Historian The element was not named after a place.
Game 3 Doctor Under normal circumstances, it is not found in human or animal cells.	Game 3 Chemist This element is not inert. It will bond to other elements, usually metals.

Game 3 Physicist Atoms of this element have more neutrons than protons.	Game 3 Historian The discovery of this element had no connection with the element iodine.
Game 4 Doctor It is not known to be harmful to humans or animals.	Game 5 Doctor It is not used as a main ingredient in any medicines.
Game 4 Physicist It won't bond to any of the other elements in this mystery.	Game 5 Physicist Atoms of this element have an unequal number of neutrons and protons.
Game 4 Chemist It can't float in the air.	Game 5 Chemist It won't bond to any of the other elements in this mystery.
Game 4 Historian It was not predicted by Mendeleyev.	Game 5 Historian This element was discovered by a man.

Game 6 Doctor It is never used in hospitals, not even in the laundry room.	Game 7 Doctor I don't think you'll find this element in any mineral supplements.
Game 6 Chemist I've never seen anything "green" about this element when testing it in my lab.	Game 7 Chemist It doesn't melt easily.
Game 6 Physicist Atoms of this element want to add more than one electron to their outer shells.	Game 7 Physicist The element is "naturally occurring" meaning you can find it somewhere in nature.
Game 6 Historian Eliminate any elements that have a connection to alchemy.	Game 7 Historian It was not one of the elements that ancient peoples recognized.
Game 8 Doctor It is necessary for the proper functioning of the human body.	Game 8 Physicicst Atoms of this element do not have the same number of neutrons and protons.

Game 8 Chemist It is not a metal.	Game 8 Historian It was not discovered by Sir Humphry Davy.
Game 9 Doctor Your cells don't use this element.	Game 10 Doctor I have never used this element in my medical practice.
Game 9 Physicist Atoms of this element have more than one electron in their outer shell.	Game 10 Physicist The element is not in group 5.
Game 9 Chemist It can bond with other elements.	Game 10 Chemist I am sure I have never used it in my lab. I think I would know if I had!
Game 9 Historian Eliminate any elements that Aristotle and Plato would have known about.	Game 10 Historian Mendeleyev never predicted the discovery of this element.

Game 11 Doctor It is not magnetic enough to be useful in diagnostic imaging machines.	Game 12 Doctor It is not used by cardiologists.
Game 11 Chemist It never looks shiny.	Game 12 Chemist It does not normally form alloys.
Game 11 Physicist Its atoms have a "d" orbital.	Game 12 Physicist Atoms of this element have "d" orbitals.
Game 11 Historian It shows the legacy of Alexander the Great and his Greek empire.	Game 12 Historian This element was never directly involved in any famous disasters.

FINAL REVIEW

Name _____

(NOTE: You are allowed to look at a Periodic Table while doing this activity.)

ATOMIC SYMBOLS

Can you remember the symbols for these elements?

1) nitrogen ____ 3) fluorine ____ 5) chlorine ____ 7) helium ____ 9) carbon ____
2) gold ____ 4) iron ____ 6) magnesium ____ 8) lithium ____ 10) zinc ____

Can you remember the elements for these symbols?

11) Pb _____ 13) Ag _____ 15) Hg _____ 17) K _____
12) Xe _____ 15) Ar _____ 16) Na _____ 18) Al _____

QUESTIONS

19) The elements are listed in numerical order. Hydrogen is 1, helium is 2, lithium is 3, etc. What do the numbers mean?
a) the mass (weight) of the atom b) the number of protons it has c) the number of neutrons it has
d) the order in which it was discovered e) the size of the atom

20) The word "valence" means:
a) the number of protons an atom wants to eject from the nucleus
b) the mass (weight) of an atom
c) the number of electrons an atom wants to gain or get rid of
d) whether an ion is positively or negatively charged

21) If you were doing an experiment in which you wanted electricity to flow through an element, which of these elements would you choose? a) iodine b) gold c) sulfur d) magnesium e) mercury

22) What is the best and easiest way to separate the sodium and chlorine atoms in NaCl?
a) smash NaCl with a hammer c) put the NaCl into water
b) put electricity through the NaCl d) pull the atoms apart with tweezers

23) Which of these statements is NOT true about carbon?
a) Carbon atoms can bond with <u>any</u> element on the Periodic Table.
b) Carbon has a valence of +4 or -4.
c) Carbon has the ability to grab small molecules and hold on to them.
d) Carbon is one of the key elements in the chemistry of living things.
e) Carbon is the element that diamonds are made of.

24) In which type of bonding are electrons given away?
a) covalent b) ionic c) metallic d) all of these

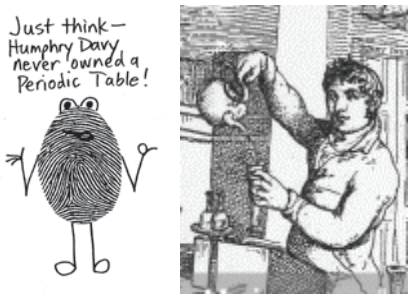
25) In which type of bonding are the electrons able to move about freely?
a) covalent b) ionic c) metallic d) all of these

TRUE or FALSE? (Write T or F on the line.)

26) ___ Hydrogen atoms do not have any neutrons.
27) ___ The noble gases are toxic to breathe, just like chlorine gas is.
28) ___ The elements in the actinide series are the only radioactive elements on the Periodic Table.
29) ___ Ionic compounds (that join an alkali metal to a halogen) are called salts.
30) ___ If an atom were as large as a sports stadium, the nucleus would be about the size of a marble.

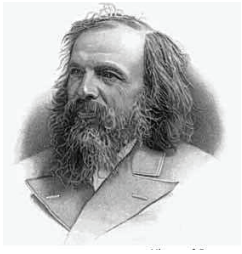
"ODD ONE OUT" Figure out which one in each set does not belong and circle it.
Consider the chemical properties of the elements, as well as what family groups they belong to. (Don't consider letters or numbers or where names came from, just chemical and physical properties.)

31) xenon argon krypton oxygen
32) lithium sodium magnesium potassium
33) technetium rhodium ruthenium molybdenum
34) iridium platinum gold mercury
35) carbon iron phosphorus sulfur
36) europium thorium gadolinium terbium
37) chlorine neon bromine nitrogen
38) uranium polonium francium californium
39) iron tin lead bismuth
40) iron aluminum neodymium samarium



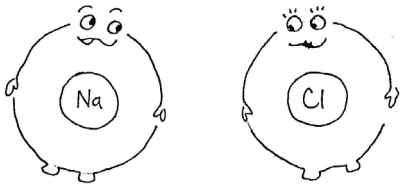
MATCH THE ELEMENT WITH ITS DISCOVERER (a few of these are from the skits)
Use these as possible answers: oxygen, magnesium, ruthenium, iodine, radium

41) Marie Curie _____
42) Humphry Davy _____
43) Antoine Lavoisier _____
44) Bernard Curtois _____
45) Karl Klaus _____


Dmitri Mendeleyev didn't discover any elements.

VALENCIES (Possible answers: -2 -1 0 +1 +2)

46) All the alkali metals have a valence of ____.
47) All the noble gases have a valence of ____.
48) All the alkali earth metals have a valence of ____.
49) All the halogens have a valence of ____.
50) Oxygen has a valency of ____.



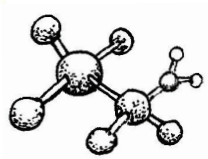
FIND THE FAKES

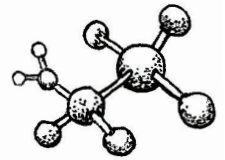
Consider each molecule carefully. Would the atoms really bond in this way? Consider the valencies. Write YES if the molecule is possible, and NO if it is very unlikely. (We have to say "unlikely" because scientists have been able to force atoms to do some pretty unlikely things if they put them under heat or pressure.)

51) KNa _____ 53) KCl _____ 55) AlGa _____ 57) MgO _____ 59) MgS_____
52) NaI _____ 54) HeCl _____ 56) HCl _____ 58) CaF _____ 60) LiF _____

A FEW MORE TRUE/FALSE QUESTIONS

61) ____ Elements that are in the same column (up and down) on the Periodic Table are likely to have similar chemical properties.
62) ____ Radioactivity is when outer shell electrons jump to a higher energy level then fall back down.
63) ____ Magnetism is caused by electrons all spinning in the same direction.
64) ____ Radon is the last (highest number) naturally occurring element on the table.
65) ____ Most elements on the table look like gray or silver metals when in their pure form and not combined with anything else.





_____
name

recited the Periodic Table from memory (up to the element indicated)

on _____
date

_____
signature of supervisor

1 H																	2 He
3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
55 Cs	56 Ba	57 La	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
87 Fr	88 Ra	89 Ac	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn	113 Nh	114 Fl	115 Mc	116 Lv	117 Ts	118 Og

58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr