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MARKING SCHEME FOR
SCIENCE 10 LAB
ANALYSIS OF SOLUTIONS

MAXIMUM = **8**

DATA:

(1)   **Table I :   Results of Mixing KNOWN Solutions**

	silver nitrate AgNO$_3$	hydrochloric acid HCl	sodium carbonate Na$_2$CO$_3$	lead (II) nitrate Pb(NO$_3$)$_2$	sodium chloride NaCl	potassium iodide KI
silver nitrate AgNO$_3$		1 White ppt	2 White ppt	3 —	4 White ppt	5 Pale yellow ppt
hydrochloric acid HCl	1 White ppt		6 Bubbles, clear solution	7 White ppt	8 —	9 —
sodium carbonate Na$_2$CO$_3$	2 White ppt	6 Bubbles, clear solution		10 White ppt	11 —	12 —
lead (II) nitrate Pb(NO$_3$)$_2$	3 —	7 White ppt	10 White ppt		13 White ppt	14 Bright yellow ppt
sodium chloride NaCl	4 White ppt	8 —	11 —	13 White ppt		15 —
potassium iodide KI	5 Pale yellow ppt	9 —	12 —	14 Bright yellow ppt	15 —	

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Table II :   Results of Mixing UNKNOWN Solutions
(1)

	UNKNOWN A	UNKNOWN B	UNKNOWN C	UNKNOWN D	UNKNOWN E	UNKNOWN F
UNKNOWN A		White ppt	—	White ppt	Bubbles, clear solution	—
UNKNOWN B	White ppt		Bright yellow ppt	—	White ppt	White ppt
UNKNOWN C	—	Bright yellow ppt		Pale yellow ppt	—	—
UNKNOWN D	White ppt	—	Pale yellow ppt		White ppt	White ppt
UNKNOWN E	Bubbles, clear solution	White ppt	—	White ppt		—
UNKNOWN F	—	White ppt	—	White ppt	—	

CONCLUDING QUESTIONS

(2.5)

1. Show the results of your analysis by filling in the table below**.**

Actual Chemical in Solution	UNKNOWN Bottle Label
$AgNO_3$	**D**
HCl	**E**
Na_2CO_3	**A**
$Pb(NO_3)_2$	**B**
NaCl	**F**
KI	**C**

2. You have been hired to analyze a water sample**.**   The person bringing you the sample tells you that it is one of the following samples**:**

> a solution containing only Pb^{2+}
> a solution containing only Ag^+**,** or
> a solution contain neither Pb^{2+} nor Ag^+**,**

but she does not know which sample it is**.** How could you use the results of your experiment to find what is in the sample you have been given?

(1.5)   Add KI: if the solution turns pale yellow, the sample contains Ag^+
                          if the sample turns bright yellow, the sample contains Pb^{2+}
                          if the sample does not turn pale or bright yellow, the sample contains neither Ag^+ nor Pb^{2+}.

3. Why isn't it necessary to mix the chemical combinations for the grey squares in Data Table I?

(1)   An ion won't react with itself or no reaction will occur.

4. Why is it unnecessary to mix **BOTH** the solutions in the upper triangle of 15 squares **AND** the lower triangle of 15 squares in Data Table I? In other words**,** why is it permissible to copy the results from the upper set of 15 squares into the "kitty corner" set of 15 squares below the grey band?

(1)   The upper triangle might refer to adding A to B, while the lower triangle would refer to adding B to A. The two mixtures are the same and therefore do not need to be repeated.