HALIDE IONS LAB

Materials:
- Spot Plate
- 5% NaOCl (commercial bleach)
- 0.2 M Kbr
- 0.1 M NaCl
- 0.2 M Na$_2$S$_2$O$_3$
- 0.5 M Ca(NO$_3$)$_2$
- 0.2 M KI
- 0.1 M NaF
- 4 M NH$_3$ (aq)
- 3% Starch solution
- 0.1 M AgNO$_3$
- Distilled H$_2$O

Procedures:
1. Put 5 drops of 0.1 M NaF in each of four wells in Row A. Put 5 drops of 0.1 M NaCl in each of the wells in the newt row. Put 5 drops of 0.1 M KBr in each of the wells in the third row and 5 drops of 0.1 M KI in the fourth row. Reserve the 1st two rows for unknowns.
2. Add 5 drops of 0.5 M Ca(NO$_3$)$_2$ to each of the four halide solutions in Column 1. Record your observations in the data table.
3. Add 2 drops of 0.1 M AgNO$_3$ to each of the halides in Column 2 and 3. Record your observations in your data table.
4. Add 5 drops of 4 M NH$_3$ to the precipitate in Column 2. Record your observations in your data table.
5. Add 5 drops of 0.1 M Na$_2$S$_2$O$_3$ to the precipitates in Column 3. Record your observations in your data table.
6. To the halides in Column 4 add 5 drops starch solution and 1 drop bleach solution. Record your observations.
7. Obtain an unknown solution and put 5 drops of it in each of the four wells in Row E. React it with each of the reagents in Procedures 2-5. Observe and record data.
8. Obtain an unknown solution containing a mixture of halide ions. React it with each of the reagents in Procedures 2-5. Observe and record data.
9. Clean and rinse the spot plate. Clean up your table.
### Data Table:

<table>
<thead>
<tr>
<th></th>
<th>Ca(NO$_3$)$_2$</th>
<th>AgNO$_3$ NH$_3$</th>
<th>AgNO$_3$ Na$_2$S$_2$O$_3$</th>
<th>Starch and Bleach</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td>NaF</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td>NaCl</td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td>KBr</td>
</tr>
<tr>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td>KI</td>
</tr>
<tr>
<td>E</td>
<td></td>
<td></td>
<td></td>
<td>Single Unknown</td>
</tr>
<tr>
<td>F</td>
<td></td>
<td></td>
<td></td>
<td>Double Unknown</td>
</tr>
</tbody>
</table>

### Analysis Questions:

1. Which procedure(s) confirm the presence of (a) F$^-$ ions? (b) Cl$^-$ ions? (c) Br$^-$ ions? (d) I$^-$ ions?

(a)  
(b)  
(c)  
(d)