CHAPTER 9 BLM ANSWER KEY

BLM 9-1: Atomic and Ionic Radii

1. smaller; tightly; nucleus

5. valence; same; repulsive; larger

9. (a) Cl will be smaller as atomic radii decrease across the periods

(b) Na^+ is smaller because it has lost one full electron shell

(c) Al^{3+} will be smaller as there are more protons in its nucleus attracting a smaller number of electrons

(d) F^- will be smaller as it has fewer electron shells

(e) Li^+ will be smaller as it has one less shell

(f) Ti^{4+} will be smaller, as it has more protons but the same number of electrons as P^{3-}

(g) I^- will be smaller having a stronger nuclear charge

(h) Sn^{4+} will be larger as it has many more electrons and an extra two shells

(i) Fe^{3+} will be smaller having fewer electrons attracted to a positive nucleus having the same charge as Fe^{2+}

(j) H^+ will be smaller having lost an electron whereas H^- has gained an electron.

BLM 9-2: Polyatomic Ions

1. (a) chromium(II) sulfate

(b) aluminum nitrate

(c) ammonium phosphate

(d) silver iodate

(e) mercury(I) chlorate

(f) zinc carbonate

(g) nickel(III) nitrate

(h) barium bromate

(i) beryllium carbonate

2. (a) $Fe(ClO_3)_3$ **(b)** $HgIO_3$

(c) $Al_2(SO_4)_3$ **(d)** $PbCO_3$

(e) $(NH_4)_3PO_4$ **(f)** $Ca(NO_3)_2$

(g) $KMnO_4$ **(h)** $AgFO_3$

(i) $SrSO_4$ **(j)** Na_2CrO_4

BLM 9-3: Observation Charts for Investigation 9-A

Expected answers are in the Teacher's Resource in the section dealing with this investigation.

BLM 9-4: Precipitation Reaction Predictions

Set A

	$Ba(NO_3)_2$	$BaCl_2$	Na_2CrO_4	$NaNO_3$	K_2CrO_4	KCl
$Ba(NO_3)_2$	N					
$BaCl_2$	N	N				
Na_2CrO_4	Y	Y	N			
$NaNO_3$	N	N	N	N		
K_2CrO_4	Y	Y	N	N	N	
KCl	N	N	N	N	N	N

Set B

	Na_2SO_4	$MgCl_2$	$Al_2(SO_4)_3$	$Ba(NO_3)_2$	$Sr(NO_3)_2$	$AlCl_3$
Na_2SO_4	N					
$MgCl_2$	N	N				
$Al_2(SO_4)_3$	N	N	N			
$Ba(NO_3)_2$	Y	N	Y	N		
$Sr(NO_3)_2$	Y	N	Y	N	N	
$AlCl_3$	N	N	N	N	N	N

CHAPTER 9 BLM ANSWER KEY

BLM 9-5: Writing Ionic and Net-ionic Equations

1. Ionic equation:
$3Zn^{2+}_{(aq)} + 6Cl^{-}_{(aq)} + 6Na^{+}_{(aq)} + 2PO_4^{3-}{}_{(aq)} \rightarrow Zn_3(PO_4)_{2\,(s)} + 6Cl^{-}_{(aq)} + 6Na^{+}_{(aq)}$

Net-ionic equation:
$3Zn^{2+}_{(aq)} + 2PO_4^{3-}{}_{(aq)} \rightarrow Zn_3(PO_4)_{2\,(s)}$

Spectator ions: $6Cl^{-}_{(aq)} + 6Na^{+}_{(aq)}$

2. Ionic equation:
$Pb^{2+}_{(aq)} + 2NO_3^{-}{}_{(aq)} + 2Na^{+}_{(aq)} + S_2^{-}{}_{(aq)} \rightarrow PbS_{(s)} + 2NO_3^{-}{}_{(aq)} + 2Na^{+}_{(aq)}$

Net-ionic equation: $Pb^{2+}_{(aq)} + S^{2-}_{(aq)} \rightarrow PbS_{(s)}$

Spectator ions: $2NO_3^{-}{}_{(aq)} + 2Na^{+}_{(aq)}$

3. Ionic equation: No reaction – all substances are soluble

4. Ionic equation: No reaction – all substances are soluble

5. Ionic equation:
$2Fe^{3+}_{(aq)} + 3SO_4^{2-}{}_{(aq)} + 3Pb^{2+}_{(aq)} + 2ClO^{3-}_{(aq)} \rightarrow 3PbSO_{4\,(s)} + 2Fe^{3+}_{(aq)} + 2ClO^{3-}_{(aq)}$

Net-ionic equation:
$3Pb^{2+}_{(aq)} + 3SO_4^{2-}{}_{(aq)} \rightarrow 3PbSO_{4\,(s)}$

Spectator ions: $2Fe^{3+}_{(aq)} + 2ClO_3^{-}{}_{(aq)}$

BLM 9-6: Solution Terminology

1. conductor
2. ionic equation
3. spectator ions
4. salt
5. metallic
6. net-ionic equation
7. soluble
8. stronger
9. less soluble
10. precipitate
11. insoluble
12. double displacement

BLM 9-7: Solution Terminology Matchup

1. E	**2.** B	**3.** A	**4.** C	**5.** D
6. N	**7.** J	**8.** F	**9.** K	**10.** M
11. O	**12.** L	**13.** I	**14.** G	**15.** H

BLM 9-8: Chapter 9 Test

1. C	**2.** B	**3.** C	**4.** B	**5.** B
6. A	**7.** A	**8.** A	**9.** B	**10.** B
11. B	**12.** A	**13.** C	**14.** C	**15.** C
16. B	**17.** C	**18.** A	**19.** D	**20.** D
21. A	**22.** B	**23.** C	**24.** B	**25.** C
26. D	**27.** D	**28.** A	**29.** D	**30.** C