

**SECTION 11.3 REACTIONS IN AQUEOUS SOLUTION (pages 342–344)**

*This section explains how to write and balance net ionic equations. It also describes the use of solubility rules to predict the formation of precipitates in double-replacement reactions.*

**► Net Ionic Equations (pages 342–343)**

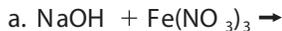
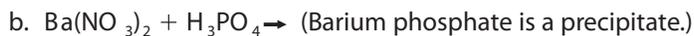
1. Many important chemical reactions take place in \_\_\_\_\_ .
2. An equation that shows dissolved ionic compounds as their free ions is called a(n) \_\_\_\_\_ .
3. Is the following sentence true or false? A spectator ion is not directly involved in a reaction. \_\_\_\_\_
4. What is a net ionic equation? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
5. Circle the letter of each sentence that is true about ionic equations.
  - a. A complete ionic equation shows only the ions involved in the reaction.
  - b. Spectator ions are left out of a net ionic equation.
  - c. Atoms do not need to be balanced in an ionic equation.
  - d. Ionic charges must be balanced in a net ionic equation.
6. Write the balanced net ionic equation for this reaction:  
 $\text{Pb}(\text{NO}_3)_2(\text{aq}) + \text{KI}(\text{aq}) \longrightarrow \text{PbI}_2(\text{s}) + \text{KNO}_3(\text{aq})$ . Show your work.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**► Predicting the Formation of a Precipitate (page 344)**

7. What determines whether a precipitate forms when two solutions of ionic compounds are mixed?  
\_\_\_\_\_
8. Use Table 11.3 on page 344 to predict whether the following compounds are soluble or insoluble.
  - a.  $\text{Fe}(\text{OH})_3$  \_\_\_\_\_
  - b.  $\text{NaOH}$  \_\_\_\_\_
  - c.  $\text{Ca}(\text{ClO}_3)_2$  \_\_\_\_\_
  - d.  $\text{HgSO}_4$  \_\_\_\_\_

**CHAPTER 11, Chemical Reactions** (continued)**GUIDED PRACTICE PROBLEM 18** (page 335)

18. Write the products of these double-replacement reactions. Balance each equation.

**Analyze**

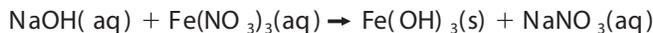
Step 1. Identify relevant concepts.

The driving force is the formation of the precipitate iron (III) hydroxide—

**Solve**

Step 2. Apply concepts to this situation.

Fe and Na replace each other. A reaction occurs resulting in the skeleton equation:

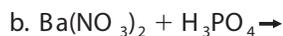


Balancing this equation gives this result:

---

Step 3 Write net ionic for balanced equation:

---

**Analyze**

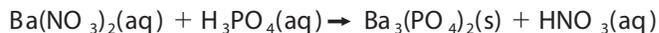
Step 1. Identify relevant concepts.

The driving force is the formation of the precipitate barium phosphate—

**Solve**

Step 2. Apply concepts to this situation.

Ba and H replace each other. A reaction occurs resulting in the skeleton equation:



Balancing this equation gives the result:

---

Step 3 Write net ionic for balanced equation:

---