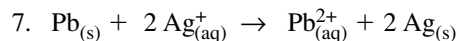
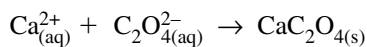
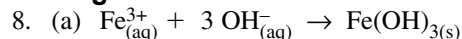


or (if the oxalate ion formula is written in condensed form)



Making Connections



(b) Filtration to remove the precipitate is the most likely process.

Explore an Issue

Debate: Producing Photographs

(Page 336)

- At first glance, it seems that digital cameras are more environmentally friendly than film cameras: they don't require film, film canisters, developing paper, or processing chemicals. However, this conclusion is based upon the assumption that only the final products affect the environment.
- To argue against the proposition you need to recognize that the whole story of a product must be considered, including everything from the extracting of resources to manufacturing through disposal. For example, are there components of the digital camera that during manufacture cause the emission of toxins into the environment, or, when the camera must be disposed of, are there environmental concerns?
- Recognize that the resolution requires an environmental perspective only; you need not consider, for example, economic, social, and technological arguments. In your investigation, you could look at subtopics such as raw materials, manufacturing, the developing process, the developing technology (and its environmental impact back to its origins), and disposal.
- Consider the logic of the presentation and the quantity of evidence used to support the position taken. Were all stages from pre-manufacturing through post-disposal considered?

SECTION 7.3 QUESTIONS

(Page 336)

Understanding Concepts

- $\text{Pb}_{(\text{aq})}^{2+} + \text{SiO}_{3(\text{aq})}^{2-} \rightarrow \text{PbSiO}_{3(\text{s})}$
- $3\text{Ca}_{(\text{aq})}^{2+} + 2\text{PO}_{4(\text{aq})}^{3-} \rightarrow \text{Ca}_3(\text{PO}_4)_{2(\text{s})}$
- $\text{Cu}_{(\text{s})} + 2\text{Ag}_{(\text{aq})}^{+} \rightarrow \text{Cu}_{(\text{aq})}^{2+} + 2\text{Ag}_{(\text{s})}$

Making Connections

- Student answers will vary widely, as they will be specific to the regulations controlling local hazardous waste facilities.

 GO TO www.science.nelson.com, Chemistry 11, Teacher Centre.

7.4 WASTE WATER TREATMENT

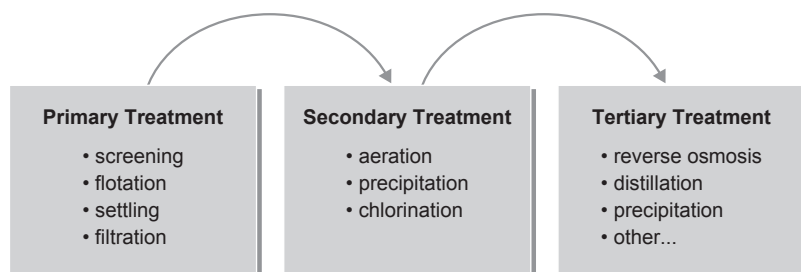
PRACTICE

(Page 340)

Understanding Concepts

- Problems from the release of untreated sewage include: transmission of disease, lowering of oxygen levels, and rapid growth of aquatic plant life.
- A high BOD reading is an indication that bacteria are using up oxygen to decompose organic material in the water. This is a problem for any oxygen-using life form in the water.

3.



4. Material that flows into a rural septic system is generally removed only by bacterial decomposition. Ideally, only water and biodegradable substances should be flushed. Homeowners should be careful not to overwhelm the decomposition process by flushing large quantities of any pollutants.

Reflecting

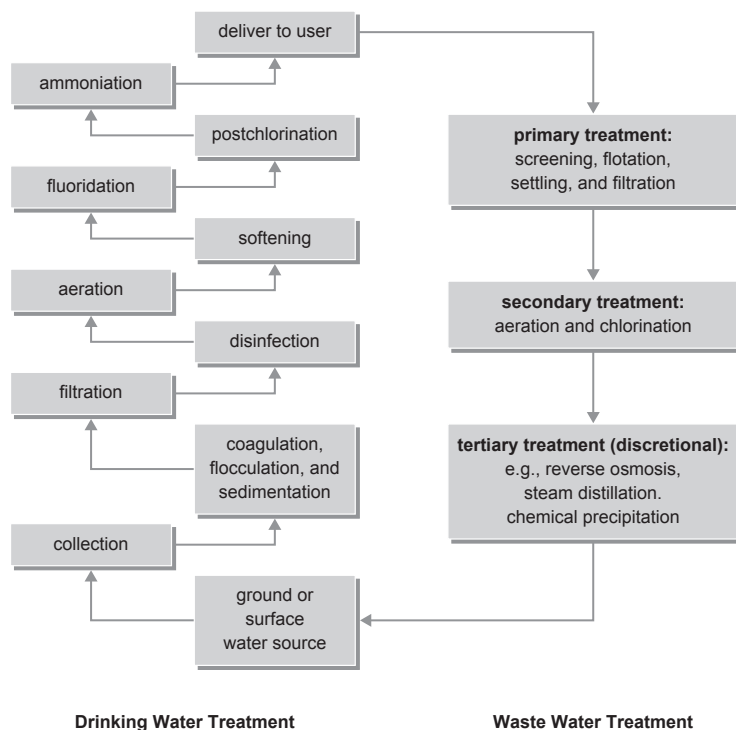
5. What goes down our drains is likely to end up in the ground or surface water. Being careful about waste disposal at home and at school can make a cumulative positive difference in the quality of our environment.

SECTION 7.4 QUESTIONS

(Page 340)

Understanding Concepts

1.



Applying Inquiry Skills

2. (a) **Hypotheses**

- (1) The fish kill may be due to a lack of oxygen caused by sewage discharge of organic matter into the river.
or
(2) The fish kill may be due to discharge of toxic material or a disease-causing organism into the river.

(b) **Prediction (1)**

The fish kill is caused by a high BOD, due to excess discharge of organic matter in sewage upstream.

Experimental Design (1)

The water is tested for oxygen and for organic matter, every 500 m upstream from the fish-kill area to the industrial town.

Prediction (2)

The fish kill is caused by toxic chemicals or disease organisms in the sewage discharge upstream.

Experimental Design (2)

The water is tested for chemicals and for organisms causing common diseases in fish, every 500 m upstream from the fish-kill area to the industrial town.

Note: This is an example of a correlational study (see Appendix A1, pages 608 – 9). Technically, correlational studies are inductive investigations without a hypothesis and a prediction. Note above that when forced, a hypothesis and a prediction are similar, indicating that the investigation is inductive and that neither a hypothesis nor a prediction should be used.

Making Connections

- Garbage disposal units decrease the amount of solid bagged waste from a household, which cuts costs and extends the usefulness of landfills. However, the increase of organic matter in the sewage places more demand on the local waste water treatment system. Most of this food waste could be diverted to a composting system.
- Answers will depend on the regulations controlling local hazardous waste facilities. Unless the local area has a tertiary treatment facility, there will automatically be an argument for improvement. The only logical long-term human goal is to eventually have all waste water returned to the cycle in a form that puts no stress on the environment.



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7.5 QUALITATIVE CHEMICAL ANALYSIS

PRACTICE

(Page 342)

Understanding Concepts

- colourless
 - blue
 - yellow-brown
 - orange
 - colourless
 - green
- yellow-red
 - blue
 - yellow
 - violet
 - colourless
- yellow-red
 - light blue-grey
 - bright red
 - green

Applying Inquiry Skills

- Analysis**
According to Table 2, Colours of Flames:
solution A contains K^+ ions,
solution B contains Cu^{2+} ions,
solution C contains Na^+ ions,
solution D contains Ca^{2+} ions, and
solution E contains Li^+ ions and/or Sr^{2+} ions.
 - Evaluation**
The design of this experiment is too limited. It only identifies those positive ions (cations) in the solutions that