

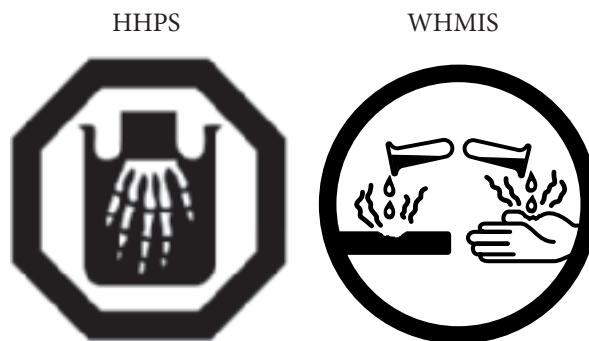
15. Indicators change colour as the pH changes. They detect the presence of H and OH ions in a solution.
16. double-displacement
17. a salt and water

Thinking and Investigation

18. a) Reactants are natural gas and oxygen gas. Products are carbon dioxide and water.
b) oxygen: O₂, carbon dioxide: CO₂, water: H₂O
19. Acetic acid can be very corrosive if it is concentrated. It can be useful as food flavouring when diluted. It can also be used to extinguish fires when mixed with baking soda to produce carbon dioxide.
20. Ionic solids will dissolve in water and produce a solution that is conductive. Molecular solids may dissolve but will not be conductive. The experiment should involve putting the solids in water and then testing for conductivity.
21. a) sodium iodide
b) magnesium fluoride
c) silicon dioxide
d) phosphorus tribromide
e) sulfur dichloride
f) lithium oxide
22. a) Al₂O₃ b) NaOH
c) S₂N₂ d) NH₃
e) K₂S f) PF₃
23. In a chemical and a math equation, both sides have to be equal. A math equation can have many symbols while a chemical equation only has addition symbols. Answers may vary. For example: A chemical equation can only represent chemicals while a math equation can represent anything so they are more different.
24. a) $2 \text{AgCl} \rightarrow 2 \text{Ag} + \text{Cl}_2$
b) $\text{Cl}_2 + 2 \text{CsBr} \rightarrow 2 \text{CsCl} + \text{Br}_2$
c) $3 \text{Ca} + \text{N}_2 \rightarrow \text{Ca}_3\text{N}_2$
d) $2 \text{AgNO}_3 + \text{Ba}(\text{OH})_2 \rightarrow 2 \text{AgOH} + \text{Ba}(\text{NO}_3)_2$
25. Answers may vary. The experiment should involve taking a small amount of each solution and applying a pH indicator or using pH paper.
For example:
- Add bromothymol blue to the solution. If it is an acid, it will turn yellow. If it is a base, it will turn blue. If it is neutral, it will be green.
 - Apply the solution to pH paper. If the pH is less than 7, it is an acid. If it is 7, it is neutral. If it is greater than 7, it is a base.

Communication

26. Baking is a chemical reaction because it involves taking reactants (the ingredients), mixing them, and heating them to produce products (baked goods). The original chemicals change into new chemicals, which can be seen as a colour change and the production of a gas (bubbles). The process is not easily reversed.
27. Answers may vary. For example:
The symbols for corrosive materials are:



The HHPS edging tells you whether the danger is the contents or the container. All WHMIS have the same circle shape and refer to the contents. The HHPS could be found on oven cleaner. The WHMIS could be found on sodium hydroxide. It is more important for people to recognize HHPS since they use these household chemicals daily in their homes.

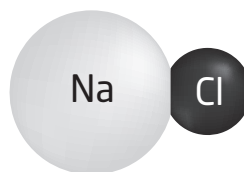
28. Chemical formulas tell you which atoms are present in the chemical and how many there are of each by using subscripts. This is simpler than a chemical name that may not indicate how many atoms are present unless it is a molecular compound.

For example:

Common name: salt

Chemical name: sodium chloride

Molecular model:



Chemical formula: NaCl

All three methods tell you that salt is made of sodium and chlorine atoms.

- 29.** To name a molecular compound like NH_3 :
- Name the first element. Nitrogen.
 - Put a prefix in front of the element if there is a subscript. There is no subscript.
 - Name the second element and change the ending to “ide”. Change hydrogen to hydride.
 - Put a prefix in front of the second element if there is a subscript. Subscript is 3, so prefix is *tri*.
Name for NH_3 is nitrogen trihydride.
- 30.** Single-displacement: $\text{A} + \text{BC} \rightarrow \text{B} + \text{AC}$
Double-displacement: $\text{AB} + \text{CD} \rightarrow \text{AD} + \text{BC}$
Synthesis: $\text{A} + \text{B} \rightarrow \text{AB}$
Decomposition: $\text{AB} \rightarrow \text{A} + \text{B}$

Application

- 31.** Wood is burned to produce carbon dioxide, carbon, and heat. Wood is made up of carbon, hydrogen, and oxygen. We burn food in our bodies by breaking down sugars and oxygen into energy, water, and carbon dioxide through cellular respiration. Sugar is made up of carbon, hydrogen, and oxygen.
- 32.** The product is in a container that can explode if it is heated or punctured. Store the product in a cool place where it cannot be crushed. Dispose of the empty container at a hazardous waste site. The product is corrosive, flammable, and poisonous. Do not ingest or inhale the product or get it on your skin. You should wear gloves, an apron, and possibly safety goggles and a mask when using the product. Only use the product in a well-ventilated area, away from possible sources of heat, flames, or sparks. Do not mix the product with other chemicals. Store the product out of reach of children and pets. Dispose of unused product at a hazardous waste site.
- 33.** Answers may vary. For example: The list does not provide enough information. It should state more clearly what chemicals are in the food and not use such complicated names.
- 34.** The corrosive nature of acids is used in glass working to make the glass look older. It is also used to etch glass and metals. It is destructive because mild acids cause tooth decay. The acids react with the calcium in teeth and cause cavities.
- 35.** Acid is corrosive. It will destroy the tissue. To treat this, use an antacid to neutralize the acid before it starts to destroy the tissue.

- 36.** Answers may vary. For example: Yes, the benefits are worth the risk. We need acids in many industries. To reduce the risk of spills, trucks should be checked frequently for unsafe tires and truckers should have to take frequent breaks. Trucks should be limited to a maximum allowable speed to prevent accidents.
- 37.** Luminol is used to detect trace amounts of blood. It reacts with the iron found in hemoglobin. Ninhydrin is used to detect fingerprints. It reacts to amines in the proteins shed in fingerprints. Sodium rhodizonate is used to detect gunpowder residue. It reacts to nitrites left by ignited gunpowder.

Literacy Test Prep

Multiple Choice

38. c)

39. b)

40. d)

Written Answer

- 41.** Answers may vary. For example: Glow sticks use energy from a series of chemical reactions to produce a safe light. There are four different chemical reactions needed to make the glow stick work and they are started by bending the stick.