

Exercises for Unit #8: Chemistry

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'Molecules' Exercises

1. What does **endothermic** mean? (a) the study of bugs (b) when a chemical reaction gives off heat (c) when a chemical reaction absorbs heat (d) the study of chemical reactions
2. Why does red cabbage work to indicate acid or bases?
3. Where can you find acetic acid in your house right now?
4. Turmeric needs to be mixed with what before it can be used as an indicator? (a) hydrogen peroxide (b) rubbing alcohol (c) acetic acid (d) cold water
5. When the red cabbage indicator is added to acetic acid, it turns (a) pink (b) blue (c) green (d) purple (e) yellow
6. What happens when you heat up your cobalt chloride painting?
7. In the electrolysis experiment, which gas gives you the "POP!" ? (a) hydrogen (b) oxygen (c) nitrogen (d) sulfur hexafluoride
8. If you splash chemicals in your eyes, what is the first thing you should do? (a) put on your safety goggles (b) scream (c) rinse with running water, like from the sink or hose (d) call poison control
9. If your dog accidentally eats your chemicals, what should you do? (a) lock him up (b) take him to the vet (c) call poison control (d) palpate his abdomen
10. Which of these are chemical changes? (a) setting a wad of paper on fire (b) chewing gum (c) eating raisins (d) initializing a cold pack
11. Which of these are physical changes? (a) light sticks (b) splashing in a puddle (c) drinking water (d) making slime

'Chemical Kinetics' Exercises

1. What are the most toxic chemicals in this unit?
(a) sodium ferrocyanide & ferric ammonium sulfate (b) calcium hydroxide & calcium chloride (c) ammonium nitrate & copper sulfate (d) dihydrogen monoxide & sodium chloride
2. What's true about phenolphthalein? (a) it goes from clear to pink when mixed with bases (b) it's impossible to smell (c) it is colorless in acidic solutions (d) soluble in water
3. Sodium ferrocyanide (a) can create a lethal gas if misused (b) should be handled with care (c) is only used once in this entire manual (d) should never be mixed with anything other than ferric ammonium sulfate
4. Which food do you expect to give the highest voltage for the fruit battery?
5. What else can you use for the copper strip in the electroplating experiment? (a) copper pipe (b) copper flashing (c) steel pipe (d) galvanized nails
6. How does increasing the hydrogen peroxide affect the rate of the iodine clock reaction?
7. Why does hydrogen peroxide come in dark bottles?
8. Which chemical turns coldest when added to water? (a) calcium chloride (b) aluminum sulfate (c) ammonium nitrate (d) citric acid
9. A polymer is: (a) a long piece of spaghetti (b) an element on the periodic table (c) a long molecular chain (d) a plastic bag
10. What does a cross-linking agent do?
11. Which of the following are cross-linking agents? (a) calcium (b) borax (c) white glue (d) starch (e) bubble gum
12. Which substance is both a solid and a liquid? (a) bubble gum (b) slime (c) cornstarch and water (d) last night's dinner

Answers to ‘Molecules’ Exercises

1. What does **endothermic** mean? (a) the study of bugs (b) when a chemical reaction gives off heat **(c) when a chemical reaction absorbs heat** (d) the study of chemical reactions
2. Why does red cabbage work to indicate acid or bases? **Red cabbage contains a naturally occurring indicator, anthocyanin. Anthocyanin is what gives leaves, stems, fruits, and flowers their colors.**
3. Where can you find acetic acid in your house right now? **In the cabinet in a bottle labeled ‘distilled white vinegar’.**
4. Turmeric needs to be mixed with what before it can be used as an indicator? (a) hydrogen peroxide **(b) rubbing alcohol** (c) acetic acid (d) cold water
5. When the red cabbage indicator is added to acetic acid, it turns **(a) pink** (b) blue (c) green (d) purple (e) yellow
6. What happens when you heat up your cobalt chloride painting? **A concentrated solution of cobalt chloride is red at room temperature, blue when heated, and pale-to-clear when frozen.**
7. In the electrolysis experiment, which gas gives you the “POP!” ? **(a) hydrogen** (b) oxygen (c) nitrogen (d) sulfur hexafluoride
8. If you splash chemicals in your eyes, what is the first thing you should do? (a) put on your safety goggles (b) scream **(c) rinse with running water, like from the sink or hose** (d) call poison control
9. If your dog accidentally eats your chemicals, what should you do? (a) lock him up (b) take him to the vet **(c) call poison control** (d) palpate his abdomen

10. Which of these are chemical changes? **(a) setting a wad of paper on fire** (b) chewing gum (c) eating raisins **(d) initializing a cold pack**
11. Which of these are physical changes? (a) light sticks **(b) splashing in a puddle** (c) drinking water (d) making slime

Chemical Kinetics Exercises

1. What are the most toxic chemicals in this unit? **(a) sodium ferrocyanide & ferric ammonium sulfate** (b) calcium hydroxide & calcium chloride (d) ammonium nitrate & copper sulfate (d) dihydrogen monoxide & sodium chloride (this one is the chemical name for water and salt)
2. What’s true about phenolphthalein? **(a) it goes from clear to pink when mixed with bases** **(b) it’s impossible to spell** (c) it is colorless in acidic solutions (d) soluble in water
3. Sodium ferrocyanide **(a) can create a lethal gas if misused** **(b) should be handled with care** **(c) is only used once in this entire manual** **(d) should never be mixed with anything other than ferric ammonium sulfate**
4. Which food do you expect to give the highest voltage for the fruit battery? **Very sour lemons.**
5. What else can you use for the copper strip in the electroplating experiment? **(a) copper pipe** **(b) copper flashing** (c) steel pipe (d) galvanized nails
6. How does increasing the hydrogen peroxide affect the rate of the iodine clock reaction? **By accelerating the first reaction, you can shorten the time it takes the solution to change color. There are a few ways to do this: You can decrease the pH (increasing H⁺ concentration), or increase the iodide or hydrogen peroxide. (To lengthen the time delay, add more sodium thiosulfate.)**

7. Why does hydrogen peroxide come in dark bottles? **Because it reacts with sunlight to turn into water and oxygen.**
8. Which chemical turns coldest when added to water? (a) calcium chloride (b) aluminum sulfate **(c) ammonium nitrate** (d) citric acid
9. A polymer is: (a) a long piece of spaghetti (b) an element on the periodic table **(c) a long molecular chain** (d) a plastic bag
10. What does a cross-linking agent do? **Coagulates the polymers. (Turns the long polymer chains into something that looks more like a fishnet.)**
11. Which of the following are cross-linking agents? (a) calcium **(b) borax** (c) white glue (d) starch (e) bubble gum
12. Which substance is both a solid and a liquid? (a) bubble gum (b) slime **(c) cornstarch and water** (d) last night's dinner