

SNC2D CHEMISTRY

CHEMICAL REACTIONS

Introduction (P.134-137)

Aspirin and Heroin

Got a headache? Like millions of other pain sufferers around the world, you may turn to Aspirin for quick relief. Surprisingly, Aspirin was first made using the same chemical reaction that produced heroin – a highly addictive and illegal narcotic.



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Aspirin and Heroin

The Bayer drug company first made Aspirin in the 1890s, but officials initially ignored the new product. In 1898, Bayer chemists used the same reaction on morphine, a well-known pain reliever at the time. Tests on the new product were impressive: it was a good pain reliever and an even better cough remedy. Plus it made the patient feel wonderful!



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Aspirin and Heroin

Soon, a new Bayer cough syrup called "Heroin" was in drug stores around the world. Shortly thereafter, reports about heroin addiction began to appear. Public pressure forced Bayer to stop producing their heroin-laced cough syrup in 1913.

NOTE!

Heroin medications are no longer available. Bayer eventually recognized Aspirin's potential, and it is now widely used around the world as a painkiller.



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Aspirin and Heroin

The history of Aspirin and heroin teaches us the importance of thoroughly testing a new product before making it available. It also shows how the chemicals we produce through chemical reactions can have both costs and benefits.



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Overall Expectations

By the end of the course, students will:

1. Analyze a variety of safety and environmental issue associated with chemical reactions, including the ways in which chemical reactions can be applied to address environmental challenges;
2. Investigate, through inquiry, the characteristics of chemical reactions;
3. Demonstrate an understanding of the general principles of chemical reactions, and various ways to represent them.

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Big Ideas

Concepts that students should retain long after this course are:


- ▶ Chemicals react with each other in predictable ways.
- ▶ Chemical reactions may have a negative impact on the environment, but they can also be used to address environmental challenges.

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Getting Started: Useful Concepts & Skills

CONCEPTS REVIEW

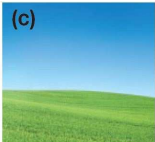
1. Refer to the three diagrams below to answer the following:
 (a) Explain why the substances are mixtures.



(a)



(b)



(c)

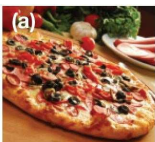
(a) Pizza (b) Tap water (c) Air

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CONCEPTS REVIEW

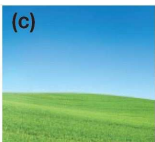
1. Refer to the three diagrams below to answer the following:
 (b) Which mixture appears different from the other two? Why?



(a)



(b)



(c)


(a) Pizza (b) Tap water (c) Air

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CONCEPTS REVIEW

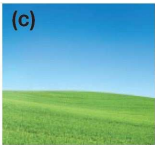
1. Refer to the three diagrams below to answer the following:
 (c) Classify each of the mixtures as being either heterogeneous or homogeneous.



(a)



(b)



(c)

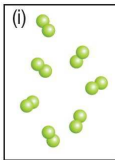
(a) Pizza (b) Tap water (c) Air

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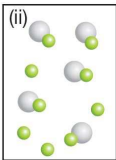
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CONCEPTS REVIEW

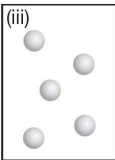
2. Refer to four diagrams below to answer the following.
 (a) Which diagrams represent pure substances and which represent mixtures? Why?



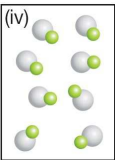
(i)



(ii)



(iii)



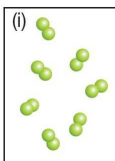
(iv)

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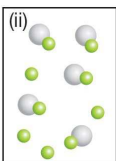
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CONCEPTS REVIEW

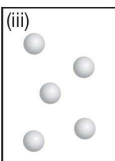
2. Refer to four diagrams below to answer the following.
 (b) Which diagram shows only atoms of one element?



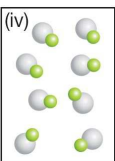
(i)



(ii)



(iii)



(iv)

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CONCEPTS REVIEW

2. Refer to four diagrams below to answer the following.
 (c) Which diagram shows only molecules of one element?

(i)

(ii)

(iii)

(iv)

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CONCEPTS REVIEW

2. Refer to four diagrams below to answer the following.
 (d) Which diagram shows only molecules of a compound?

(i)

(ii)

(iii)

(iv)

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CONCEPTS REVIEW

2. Refer to four diagrams below to answer the following.
 (e) Which diagram could represent carbon monoxide, CO?

(i)

(ii)

(iii)

(iv)

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CONCEPTS REVIEW

3. In your notebook, write the chemical formula (selected from the list on the right) of each of these substances.

(a) hydrogen	H ₂ O
(b) carbon dioxide	NaCl
(c) table salt	CO ₂
(d) hydrogen peroxide	H ₂
(e) water	O ₂
(f) oxygen	H ₂ O ₂

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CONCEPTS REVIEW

4. Draw Bohr-Rutherford (B-R) diagrams to represent the following atoms:

(a) lithium	(b) carbon	(c) chlorine	(d) argon
${}^7_3\text{Li}$	${}^{12}_6\text{C}$	${}^{35}_{17}\text{Cl}$	${}^{40}_{18}\text{Ar}$


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CONCEPTS REVIEW

5. (a) What fundamental particle inside the atom is responsible for the "hair-raising experience" shown below?

(b) Compare the three fundamental particles in an atom with respect to size, mass, charge, and location.



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SKILLS REVIEW

6. Briefly describe how you would investigate the following properties of substances in the lab.

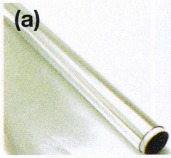
- the boiling point of water
- the solubility of different solids in water
- the gas produced when magnesium reacts with hydrochloric acid
- the reactivity of the elements lithium and sodium with water

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SKILLS REVIEW

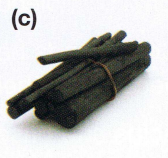
7. Suggest two tests that you would use to classify the elements below as metals or non-metals. Explain your choices.



(a)



(b)



(c)


Figure 3 (a) aluminum (b) sulfur (c) carbon

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SKILLS REVIEW

8. The following diagram shows two students performing an experiment in the lab. Find at least five lab safety errors.



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 Activity: Ada Lockridge & the ... (B4/P.152)

ISSUE
Why is knowledge about chemicals and chemical reactions important to everyone in society?

INSTRUCTIONS

- A. Read the article "B4: Ada Lockridge and the Chemical Valley"
- B. Answer Q.1,3-5/P.152
- C. As a class/group, discuss/compare your answers.

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