Name: _____ Date: _____

Investigating Mixtures

Part 1: Separating Substances Design

Safety Note: Iron Filings

Wear gloves and safety goggles when handling iron filings. If the iron filings get on your skin or clothes, tell your teacher and rinse the substance off with water. If you get the iron filings in your eyes, tell your teacher and rinse your eyes with water for 15 minutes. If the iron filings are inhaled, move to fresh air and seek medical help for any breathing difficulties.

With your group, design a method for separating the substances in the bag. The bag contains sugar, iron, wax, and sand. Describe each step of your method and list what substances are separated by each step.

Description of step	Substance(s) separated	Why did the substance(s) separate?
1.		
2.		

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Investigating Mixtures (continued)

Part 1: Separating Substances Design (continued)

3.		
4.		
5.		

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Investigating Mixtures (continued)

Part 2: Reading "This Is Not an Oxygen Tank"

1. Read and annotate the "This Is Not an Oxygen Tank" article.
2. Choose and mark annotations to discuss with your partner. Once you have discussed these annotations, mark them as discussed.
3. Now, choose and mark a question or connection, either one you already discussed or a different one that you would like to discuss with the class.
4. Discuss the reflection questions below.

Reflection Questions:

How is the diving tank similar to and different from the bag that was filled with four substances?

_____

_____

_____

_____

How is the diving tank similar to and different from the sugar water?

_____

_____

_____

_____

Active Reading Guidelines

1. Think carefully about what you read. Pay attention to your own understanding.
2. As you read, annotate the text to make a record of your thinking. Highlight challenging words and add notes to record questions and make connections to your own experience.
3. Examine all visual representations carefully. Consider how they go together with the text.
4. After you read, discuss what you have read with others to help you better understand the text.

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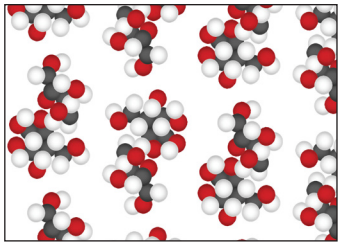
Investigating Mixtures (continued)

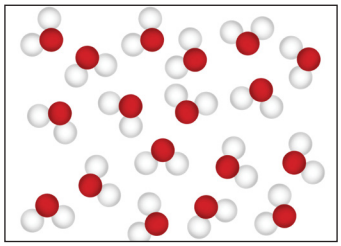
Part 3: Sugar-Water Separation

Make observations of the sugar-water drops on the plates and the atomic scale evidence below to answer the questions on this page and the next page.

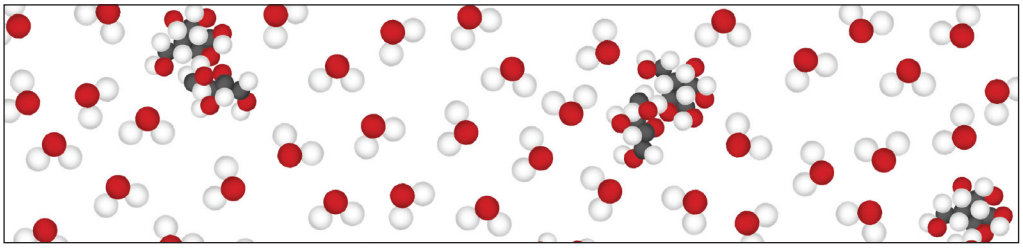
sugar



water



sugar mixed with water



When sugar and water are combined, does a chemical reaction occur or does it just form a mixture of sugar and water? Use evidence from the sugar-water drops and the atomic scale diagrams.

_____

_____

_____

_____

_____

Explain what you think happened to the drops of the sugar mixed with water that were left on the plates.

_____

_____

_____

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Investigating Mixtures (continued)

Part 4: Contaminated Water Separation

In 2014, a company accidentally spilled a large amount of a chemical called 4-Methylcyclohexanemethanol (MCHM) into a river in West Virginia. MCHM eventually got into the drinking water of many people. People noticed a strong licorice smell in their drinking water.

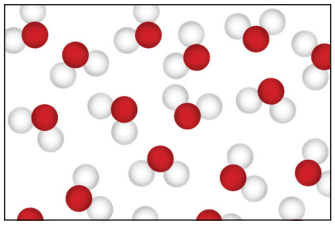
Look at the evidence below and answer the questions on the next page.

Evidence: Properties

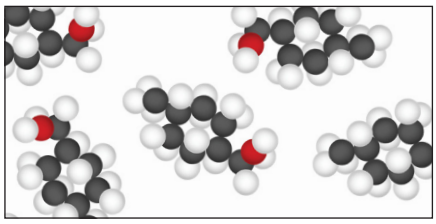
	MCMH	Water	Both together
odor	licorice	none	licorice
color	none	none	none
at room temperature	liquid	liquid	liquid
temperature at which the substance boils (turns from liquid to gas)	202°C	100°C	unknown
density	0.9 grams/cm^3	1.0 grams/cm^3	unknown

Evidence: Atomic Scale

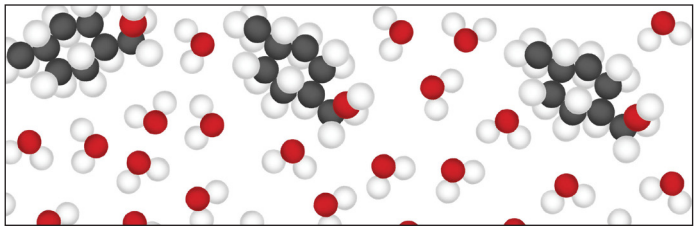
water: H_2O



MCHM: $CH_3C_6H_{10}CH_2OH$



drinking water after the spill



Name: _____ Date: _____

Investigating Mixtures (continued)

Part 4: Contaminated Water Separation (continued)

Do you think a chemical reaction occurred when the MCMH mixed with the water? Why or why not?

_____

_____

_____

_____

_____

Someone who observed the river made the following comment: *I can't see the individual substances, so it must not be a mixture.* Do you agree or disagree with this? What is your evidence?

_____

_____

_____

_____

_____

What is one idea you have about how MCHM could be separated from water? Why do you think that might work?

_____

_____

_____

_____

_____

_____