

# Grade 7 Science

## Unit 3: Mixtures and Solutions

*Chapter 9: Many useful products depend on technology for separating mixtures and solutions.*



Name: \_\_\_\_\_

Homeroom #: \_\_\_\_\_

## Separating Mixtures

Mixtures	Method of Separation	Explanation
1. Salt Water		
2. Muddy Water		
3. Nuts and Bolts		
4. Iron filings and sand		
5. Vegetable oil and sand		
6. Vegetable oil and water		
7. Salt and pepper		

Are the components you have separated still mixtures or are they pure? Explain your answer.

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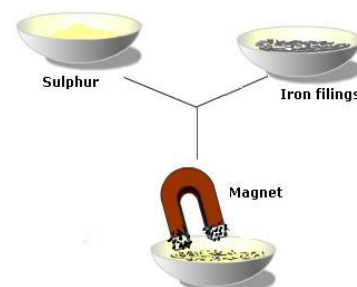
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## Separation Techniques

### 1. Mechanical Sorting

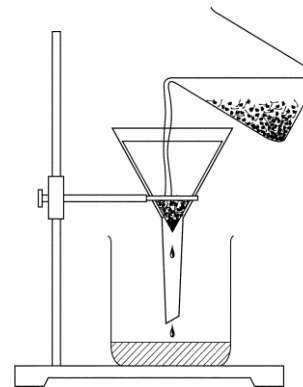
- Used to separate the parts of a mixture based on \_\_\_\_\_ such as particle size.

- Examples: \_\_\_\_\_ and \_\_\_\_\_



2. Filtration

- A common way to separate \_\_\_\_\_ particles from a mixture.
- Filters can have holes of varying sizes... \_\_\_\_\_ to \_\_\_\_\_
- Examples: \_\_\_\_\_



3. Evaporation

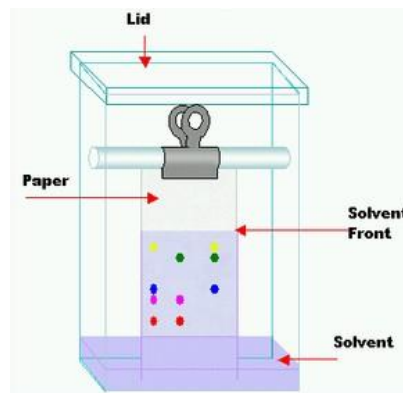
- Changes of state from a \_\_\_\_\_ to a \_\_\_\_\_
- Used to recover a solid \_\_\_\_\_ from a \_\_\_\_\_

4. Distillation

- Uses two changes of state: \_\_\_\_\_ and \_\_\_\_\_
- It allows you to recover BOTH the \_\_\_\_\_ and the \_\_\_\_\_ from a solution.

5. Paper Chromatography

- Used to separate the \_\_\_\_\_ substances in a mixture such as \_\_\_\_\_
- Used to separate the \_\_\_\_\_ in a mixture.



## Key Words

Evaporation:

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Filtration:

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Mechanical Sorting:

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Paper Chromatography:

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Simple Distillation:

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## Comprehension Questions

1. Why is it easier to separate the parts of a heterogeneous mixture than the parts of a homogeneous mixture?

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2. Why is the size of the holes in a filter important for filtration?

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3. Which part or parts of a solution does evaporation recover; the solute, the solvent, or both?

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4. Which part or parts of a solution does distillation recover; the solute, the solvent, or both?

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5. What is chromatography?

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6. How does paper chromatography work?

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7. Explain how you could separate each of the following mixtures:

a) Wood chips and pieces of granite rock.

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b) Iron filings and wood sawdust.

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c) Salt and pepper.

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## Unit 3 Summary

### Chapter 7 Matter can be classified as mixtures or pure substances.

- Matter can be either mixtures or pure substances. (7.1)
- Mixtures may be either heterogeneous or homogeneous. (7.1)
- Homogeneous mixtures (solutions) have the same properties throughout. (7.1)
- Heterogeneous mixtures have different visible parts with different properties. (7.1)
- Matter is either a mixture or a pure substance based on the types of particles that make it up. (7.2)
- Each pure substance has its own type of particle, which is different from the kinds of particles that make up all other pure substances. (7.2)

### Chapter 8 Some substances dissolve to form solutions faster and more easily than others.

- In a solution, the substance that dissolves is the solute, and the substance in which the solute dissolves is the solvent. (8.1)
- A substance is soluble in a solvent if it dissolves in the solvent. A substance is insoluble in a solvent if it does not dissolve in the solvent. (8.1)
- A concentrated solution has a larger mass of solute for certain volume of solvent. A dilute solution has a smaller mass of solute for a certain volume of solvent. (8.2)
- Solution concentration may be expressed in units of grams of solute per litre of solvent (g/L). (8.2)
- A solution is saturated when as much solute has dissolved in a solvent as it can, at a certain temperature. (8.2)
- Different solutes have different solubilities, which may be increased by increasing the temperature. (8.2)
- Stirring a solution increases the rate of dissolving but not the solubility of the solute. (8.2)

### Chapter 9 Many useful products depend on technology for separating mixtures and solutions.

- Heterogeneous mixtures may be separated by methods that include sorting by hand, mechanical sorting, and filtration. (9.1)
- Mechanical sorting of a mixture is based on properties such as particle size and magnetism. (9.1)
- Homogeneous mixtures may be separated by methods that include evaporation, distillation, and paper chromatography. (9.1)

## Unit 3 Review

Circle the letter of the best answer.

1. Which is the method that is used to separate and recover the parts of a liquid solution?

- A. condensation
- B. distillation
- C. evaporation
- D. saturation

2. Which of the following is an example of a solution?

- A. oil in water
- B. oxygen in air
- C. pepper in water
- D. dust in air

3. Which of the following is a homogeneous mixture?

- A. antifreeze
- B. gold ore
- C. milk
- D. petroleum

4. Which of the following lists contains all pure substances?

- A. gold, oxygen, carbon dioxide
- B. milk, water, copper
- C. squeezed orange juice, silver, soda water
- D. tea, salt, concrete

5. In the following list of substances, which is the most soluble in water?

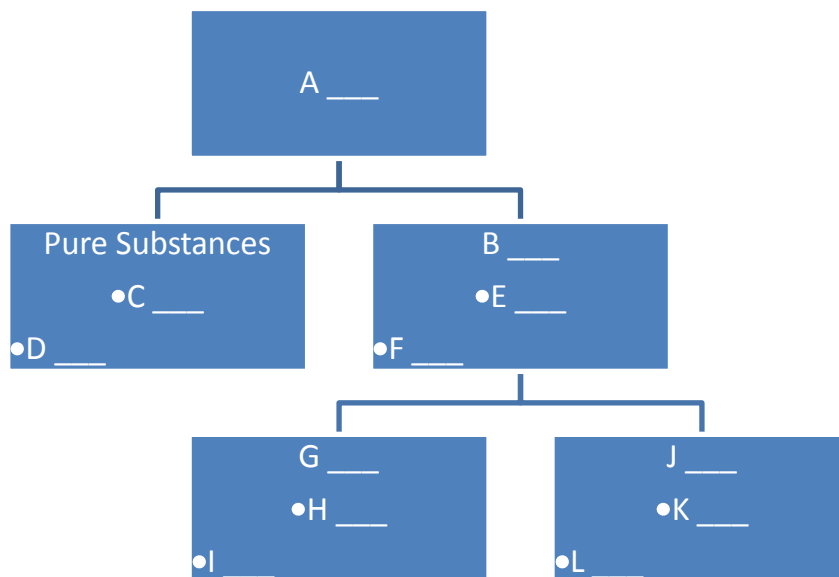
- A. carbon dioxide
- B. ethanol
- C. sugar
- D. table salt

6. Which of the following labels for the picture below is correct?

- A. solute + solvent = solution
- B. solvent + solute = saturation
- C. solvent + solute = soluble
- D. solvent + solute = solution



In the space beside each letter, write the numeral of the choice that is the best match. Each numeral choice may be used only once.



- 7. Mixtures
- 8. Homogeneous
- 9. Heterogeneous
- 10. Matter
- 11. contain two or more components
- 12. composition varies within the sample and from one sample to another



- 13. hard to see the different parts
- 14. the one component is made up of just one type of particle
- 15. composition is the same throughout the sample and from one sample to another
- 16. each component keeps its own properties
- 17. easy to see the different parts
- 18. contains only one component

19. In the space below, write a suitable title for the flowchart.

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### Short Answer Questions

20. One way to increase the rate that a solute dissolves in a solvent is to stir the mixture. Name two other ways to increase the rate of dissolving.

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21. If a spoonful of cornstarch is added to a glass of water, a cloudy mixture results. Describe two ways to separate the two parts of this mixture.

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22. Many common activities at home and in industry involve separating mixtures. Identify four examples or situations that illustrate this statement.

(1) \_\_\_\_\_ (3) \_\_\_\_\_

(2) \_\_\_\_\_ (4) \_\_\_\_\_

23. The concentration of solutions can be expressed in units that include g/L, ppm, and %. Give one example of a product whose concentration is expressed in each unit.

(1) \_\_\_\_\_ (3) \_\_\_\_\_

(2) \_\_\_\_\_