Solutions, colloids, suspensions (Item No.: P7154800)

Curricular Relevance

Area of Expertise: Chemie

Education Level: Klasse 7-10

Topic: Anorganische Chemie

Subtopic: Wasser

Experiment: Lösungen, Kolloide, Suspensionen

Difficulty	Preparation Time	Execution Time	Recommended Group Size
Easy	10 Minutes	10 Minutes	2 Students

Additional Requirements:

Experiment Variations:

Keywords:

solutions, suspensions, colloids

Task and equipment

Information for teachers

Learning objectives

- Mixtures of solids and water form in physically different ways.
- Depending on the degree of dispersion one can differentiate between solutions, colloids and suspensions.

Hazards

- Wear protective glasses!

Notes

Any commercial wallpaper adhesive can be used for this experiment. Instead of loam, fine sand can also be used; in this case however separation occurs more rapidly. The loamy water can be reserved for the "Water treatment in sewage treatment plants" experiment.

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Instead of the simple device using a cardboard filter and an electric torch, an optical bench with appropriate diaphragms and lenses can be used, if available. The liquids to be investigated can be held in its ray path.

Remarks on the method

This experiment continues where the "Properties of mixtures" experiment left off and could also be implemented there in the scope of the topic "Mixtures".In addition to the new concepts that have been elaborated here, the terms emulsion, smoke, fog, etc. could be reviewed.

Waste disposal

- Dispose of the salt water in the collection container for acids and alkalis.
- Pour the loamy water and the adhesive solution into the compostable wastes or down the drain (rinse with abundant water).

Robert-Bosch-Breite 10
D - 37079 Göttingen

Tel: +49 551 604 - 0
Fax: +49 551 604 - 107

info@phywe.de
www.phywe.com

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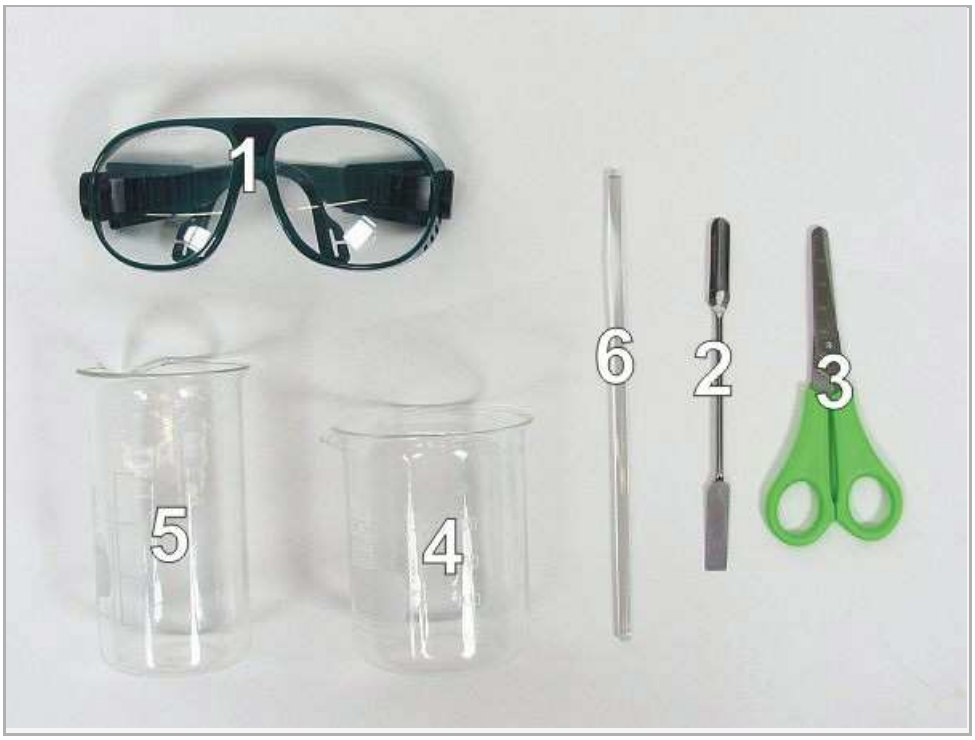
Task and equipment

Task

In which form do substances dissolve in water?

Mix several substances in water and investigate the resulting types of mixtures.

Equipment



Position No.	Material	Order No.	Quantity
1	Protecting glasses, clear glass	39316-00	1
2	Spatula, powder, steel, l=150mm	47560-00	1
3	Scissors, l = 110 mm, straight, point blunt	64616-00	1
4	Glass beaker DURAN®, short, 250 ml	36013-00	1
5	Glass beaker DURAN®, tall, 250 ml	36004-00	1
6	Glass rod,boro 3.3,l=200mm, d=5mm	40485-03	1
	Sodium chloride 250 g	30155-25	1
Aditional material			
	Black cardboard (DIN A5)		
	Light source, e.g. electric torch		
	Loam (sand)		
	Salt water (sea water)		
	Scotch tape		
	Wallpaper adhesive		
	Water		

Set-up and procedure

Set-up

Hazards

- Wear protective glasses!

Set-up

Roll the cardboard into funnel shape such that a small opening with a maximum diameter of 1 cm results (Fig. 1) and tape it securely with Scotch tape.

Fig. 1

Fill the two glass beakers with approximately 200 ml of water (Fig. 2).

Fig. 2

Procedure

Procedure

Put two spatulafuls of wallpaper adhesive into the first beaker (Fig. 3) and stir well with a glass rod (Fig. 4). Allow the mixture to stand for approximately 15 minutes until the adhesive has completey dissolved, and then stir it vigorously.


Fig. 3


Fig. 4

In the meantime, add two spatulafuls of table salt to the second beaker (Fig. 5) and stir it with the cleaned glass rod (Fig. 6). Hold the cardboard funnel in front of the electric torch. In a darkened room shine the light beam through the table salt solution (Fig. 7).


Fig. 5


Fig. 6


Fig. 7

Clean the glass beaker with the table salt solution, fill it with approximately 200 ml of water and add 2 spatulafuls of loam. Mix thoroughly with the glass rod (Fig. 8). Hold the cardboard funnel in front of the electric torch. In a darkened room shine the light beam succesively through the two solutions.

Fig. 8

Waste disposal

- Dispose of the salt water in the collection container for acids and alkalis.
- Pour the loamy water and the adhesive solution into the compostable wastes or down the drain (rinse with abundant water).

Report: Solutions, colloids, suspension

Result - Observations

Note your observations.

a) Water + adhesive:

b) Water + salt:

c) Water + loam:

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Evaluation - Question 1

Draw conclusions based on your observations.

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Evaluation - Question 2

Based on your conclusions, comment on the terms solution, colloid, suspension.

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Evaluation - Question 3

Name other naturally examples for these types of mixtures.

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