

8.5 Chemistry Mixture Problems

Name: _____

Write your
questions here!



Introduction

In this section, you will learn how to solve chemistry problems. The information presented here will include steps on how to: deal with percents, organize information, and algebraically mix chemicals using an equation. The sections within this lesson are:

- [Chemistry Basics](#)
- [Chemistry I](#)
- [Chemistry II](#)
- [Instructional Videos](#)
- [Interactive Quizzes](#)
- [Related Lessons](#)

Chemistry Basics

There are numerous careers that deal with the mixing of chemicals. So, it is important to know how to mathematically handle chemistry problems in order to understand what they mean and how to prepare specific quantities of chemicals.

For instance, if 5 liters of 15% hydrogen peroxide (H_2O_2) solution was in a container, we should be able to determine the actual amount of acid there is in the solution. It turns out, only 15% of the solution is acid; the rest is water.

To best handle this mathematically, using a table will help. The table below will help us organize information.

	Volume	Percent	Amount of Acid
H_2O_2			

Write your
questions here!



Chemistry I

Since chemistry basics explained the connection between a solution's volume, concentration, and amount of acid, we will use a table to best organize the information found within a problem like this:

If 50 liters of 12% hydrochloric acid (HCl) is mixed with 80 liters of 40% hydrochloric acid, how much acid would result and what would be the concentration of the final solution?

First, this is the table that will be used to solve the problem.

	Volume	Percent	Amount of Acid
Strong Solution			
Weak Solution			
Total Mixture			

Second, we will divide the two mixtures into a strong acid, 80 liters of the 40% acid, and a weak acid, 50 liters of the 12% acid. We will place their volumes into the table in their respective places.

Write your
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Chemistry II

The chemistry I section used a table to solve the mixture of two chemicals. We will use the same table to solve a problem like this one:

How much 10% sulfuric acid (H_2SO_4) must be mixed with how much 30% sulfuric acid to make 200 milliliters of 15% sulfuric acid?

First, this table will be used.

	Volume	Percent	Amount of Acid
Strong Solution			
Weak Solution			
Total Mixture			

Second, we have to deal with two solutions of sulfuric acid. We have a weak solution, the 10% solution, and a strong solution, the 30% solution. So, we will place them in the correct places within the table as decimal numbers.

Write your
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Chemistry Problems Making a Specific Mixture

Dr. Egor has to make 500 mL of a 12 % sulfuric acid solution.
He can only use a 20% concentration and a 5 % concentration to do so.
How many mL of 5 % and 20 % should he use?

	Volume	Percent	Amount of Acid
Strong Solution			
Weak Solution			
Total Mixture			

SUMMARY:

Now,
summarize
your notes
here!



8.5 Practice - Mixture Problems

Complete odd problems below on a separate sheet of paper. (For each problem, include mixture table and show work)

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- 1) A tank contains 8000 liters of a solution that is 40% acid. How much water should be added to make a solution that is 30% acid?
 - 2) How much antifreeze should be added to 5 quarts of a 30% mixture of antifreeze to make a solution that is 50% antifreeze?
 - 3) Of 12 pounds of salt water 10% is salt; of another mixture 3% is salt. How many pounds of the second

should be added to the first in order to get a mixture of 5% salt?

4) How much alcohol must be added to 24 gallons of a 14% solution of alcohol in order to produce a 20% solution?

5) How many pounds of a 4% solution of borax must be added to 24 pounds of a 12% solution of borax to obtain a 10% solution of borax?

6) How many grams of pure acid must be added to 40 grams of a 20% acid solution to make a solution which is 36% acid?

7) A 100 LB bag of animal feed is 40% oats. How many pounds of oats must be added to this feed to produce a mixture which is 50% oats?

8) A 20 oz alloy of platinum that costs \$220 per ounce is mixed with an alloy that costs \$400 per ounce. How many ounces of the \$400 alloy should be used to make an alloy that costs \$300 per ounce?

9) How many pounds of tea that cost \$4.20 per pound must be mixed with 12 lb of tea that cost \$2.25 per pound to make a mixture that costs \$3.40 per pound?

10) How many liters of a solvent that costs \$80 per liter must be mixed with 6 L of a solvent that costs \$25 per liter to make a solvent that costs \$36 per liter?

11) How many kilograms of hard candy that cost \$7.50 per kilogram must be mixed with 24 kg of jelly beans that cost \$3.25 per kilogram to make a mixture that sells for \$4.50 per kilogram?

12) How many kilograms of soil supplement that costs \$7.00 per kilogram must be mixed with 20 kg of aluminum nitrate that costs \$3.50 per kilogram to make a fertilizer that costs \$4.50 per kilogram?

13) How many pounds of lima beans that cost 90c per pound must be mixed with 16 lb of corn that cost 50c per pound to make a mixture of vegetables that costs 65c per pound?

14) How many liters of a blue dye that costs \$1.60 per liter must be mixed with 18 L of anil that costs \$2.50 per liter to make a mixture that costs \$1.90 per liter?

15) Solution A is 50% acid and solution B is 80% acid. How much of each should be used to make 100cc. of a solution that is 68% acid?

16) A certain grade of milk contains 10% butter fat and a certain grade of cream 60% butter fat. How many quarts of each must be taken so as to obtain a mixture of 100 quarts that will be 45% butter fat?

17) A farmer has some cream which is 21% butterfat and some which is 15% butter fat. How many gallons of each must be mixed to produce 60 gallons of cream which is 19% butterfat?

18) A syrup manufacturer has some pure maple syrup and some which is 85% maple syrup. How many liters of each should be mixed to make 150L which is 96% maple syrup?

19) A chemist wants to make 50ml of a 16% acid solution by mixing a 13% acid solution and an 18% acid solution. How many milliliters of each solution should the chemist use?

20) A hair dye is made by blending 7% hydrogen peroxide solution and a 4% hydrogen peroxide solution. How many milliliters of each are used to make a

300 ml solution that is 5% hydrogen peroxide?

- 21) A paint that contains 21% green dye is mixed with a paint that contains 15% green dye. How many gallons of each must be used to make 60 gal of paint that is 19% green dye?
- 22) A candy mix sells for \$2.20 per kilogram. It contains chocolates worth \$1.80 per kilogram and other candy worth \$3.00 per kilogram. How much of each are in 15 kilograms of the mixture?
- 23) To make a weed and feed mixture, the Green Thumb Garden Shop mixes fertilizer worth \$4.00/lb. with a weed killer worth \$8.00/lb. The mixture will cost \$6.00/lb. How much of each should be used to prepare 500 lb. of the mixture?
- 24) A grocer is mixing 40 cent per lb. coffee with 60 cent per lb. coffee to make a mixture worth 54c per lb. How much of each kind of coffee should be used to make 70 lb. of the mixture?
- 25) A grocer wishes to mix sugar at 9 cents per pound with sugar at 6 cents per pound to make 60 pounds at 7 cents per pound. What quantity of each must he take?
- 26) A high-protein diet supplement that costs \$6.75 per pound is mixed with a vitamin supplement that costs \$3.25 per pound. How many pounds of each should be used to make 5 lb of a mixture that costs \$4.65 per pound?
- 27) A goldsmith combined an alloy that costs \$4.30 per ounce with an alloy that costs \$1.80 per ounce. How many ounces of each were used to make a mixture of 200 oz costing \$2.50 per ounce?
- 28) A grocery store offers a cheese and fruit sampler that combines cheddar cheese that costs \$8 per kilogram with kiwis that cost \$3 per kilogram. How many kilograms of each were used to make a 5 kg mixture that costs \$4.50 per kilogram?
- 29) The manager of a garden shop mixes grass seed that is 60% rye grass with 70 lb of grass seed that is 80% rye grass to make a mixture that is 74% rye grass. How much of the 60% mixture is used?
- 30) How many ounces of water evaporated from 50 oz of a 12% salt solution to produce a 15% salt solution?
- 31) A caterer made an ice cream punch by combining fruit juice that cost \$2.25 per gallon with ice cream that costs \$3.25 per gallon. How many gallons of each were used to make 100 gal of punch costing \$2.50 per pound?
- 32) A clothing manufacturer has some pure silk thread and some thread that is 85% silk. How many kilograms of each must be woven together to make 75 kg of cloth that is 96% silk?
- 33) A carpet manufacturer blends two fibers, one 20% wool and the second 50% wool. How many pounds of each fiber should be woven together to produce 600 lb of a fabric that is 28% wool?
- 34) How many pounds of coffee that is 40% java beans must be mixed with 80 lb of coffee that is 30% java beans to make a coffee blend that is 32% java beans?
- 35) The manager of a specialty food store combined almonds that cost \$4.50 per pound with walnuts that cost \$2.50 per pound. How many pounds of each were used to make a 100 lb mixture that cost \$3.24 per pound?
- 36) A tea that is 20% jasmine is blended with a tea that is 15% jasmine. How many pounds of each tea are used to make 5 lb of tea that is 18% jasmine?
- 37) How many ounces of dried apricots must be added to 18 oz of a snack mix that contains 20% dried apricots

to make a mixture that is 25% dried apricots?

38) How many milliliters of pure chocolate must be added to 150 ml of chocolate topping that is 50% chocolate to make a topping that is 75% chocolate?

39) How many ounces of pure bran flakes must be added to 50 oz of cereal that is 40% bran flakes to produce a mixture that is 50% bran flakes?

40) A ground meat mixture is formed by combining meat that costs \$2.20 per pound with meat that costs \$4.20 per pound. How many pounds of each were used to make a 50 lb mixture that costs \$3.00 per pound?

41) How many grams of pure water must be added to 50 g of pure acid to make a solution that is 40% acid?

42) A lumber company combined oak wood chips that cost \$3.10 per pound with pine wood chips that cost \$2.50 per pound. How many pounds of each were used to make an 80 lb mixture costing \$2.65 per pound?

43) How many ounces of pure water must be added to 50 oz of a 15% saline solution to make a saline solution that is 10% salt?

Answers to corrective - Mixture Problems

2) 2

4) 1,8

6) 10

8) 16

10) 1.5

12) 8

14) 36

16) 30, 70

18) 40, 110

20) 100, 200

22) 10, 5

24) 21, 49

26) 2,3

28) 1.5, 3.

30) 10

32) 55, 20

34) 20

36) 3,2

38) 150

40) 30, 20

42) 20, 60