

Density of Metals and Liquids

Spoken Tutorial Project

<http://spoken-tutorial.org>

National Mission on Education through ICT

<http://sakshat.ac.in>

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Learning Objectives



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We will learn to determine,



Learning Objectives

We will learn to determine,

▶ **Densities of metals and liquids**



Pre-requisites



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► ChemCollective Vlabs interface



Pre-requisites

- ▶ **ChemCollective Vlabs interface**
- ▶ **If not for relevant tutorials please visit our website**
www.spoken-tutorial.org



System Requirement



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► Mac OS v 10.10.5



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- ▶ **Mac OS v 10.10.5**
- ▶ **ChemCollective Vlabs v 2.1.0**



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- ▶ **Mac OS v 10.10.5**
- ▶ **ChemCollective Vlabs v 2.1.0**
- ▶ **Java v 8**



Archimedes' Principle



Archimedes' Principle

- ▶ An object when immersed in water will displace water



Archimedes' Principle

- ▶ **An object when immersed in water will displace water**
- ▶ **The displaced water will be equal to its volume**



Archimedes' Principle



Archimedes' Principle

- ▶ Different metals have different densities



Archimedes' Principle

- ▶ **Different metals have different densities**
- ▶ **Hence, different metals of the same weight have different volumes**



Archimedes' Principle

- ▶ Different metals have different densities
- ▶ Hence, different metals of the same weight have different volumes
- ▶ A metal that is less dense will displace more water than a denser one



Results



Results

Calculate densities using the formula:

Density=mass/volume

Solid	Mass(m)	Volume(V) = V2-V1	Density= m/V	Given Density	Metal
Metal 1	50 g	15-10=5	50/5=10	10.5	Silver
Metal 2	50 g	14-10=4	50/4=12.25	12.4	Rhodium
Metal 3	50 g	12.5-10=2.5	50/2.5=20	21.45	Platinum



Assignment



Assignment

1. Repeat the above experiment with with different metal weights (30 g and 40 g)



Assignment

1. Repeat the above experiment with with different metal weights (30 g and 40 g)
2. Tabulate and analyse your results



Results



Results

Calculate densities using the formula:

$\text{Density} = \text{mass} / \text{volume}$

Liquid	Mass (m)	Volume (V)	Density= m/V
A-1	126.0 g	100 mL	$126/100=1.26 \text{ g/mL}$
A-2	85.0 g	100 mL	$85/100=0.85 \text{ g/mL}$



Summary



Summary

We have learnt to measure,

- ▶ Densities of silver, rhodium and platinum using Archimedes' principle**
- ▶ Densities of liquids with unknown concentration**



Assignment



Assignment

1. Open default lab setup window



Assignment

1. **Open default lab setup window**
2. **You will find many stock solutions**



Assignment

1. Open default lab setup window
2. You will find many stock solutions
3. Find density for a few solutions of your choice



About the Spoken Tutorial Project

- ▶ Watch the video available at http://spoken-tutorial.org/What_is_a_Spoken_Tutorial
- ▶ It summarises the Spoken Tutorial project
- ▶ If you do not have good bandwidth, you can download and watch it



Spoken Tutorial Workshops

The Spoken Tutorial Project Team

- ▶ Conducts workshops using spoken tutorials
- ▶ Gives certificates to those who pass an online test
- ▶ For more details, please write to contact@spoken-tutorial.org



Forum for specific questions

- ▶ Do you have questions in **THIS Spoken Tutorial?**
- ▶ Please visit
<http://forums.spoken-tutorial.org>
- ▶ Choose the minute and second where you have the question
- ▶ Explain your question briefly
- ▶ Someone from our team will answer them



Acknowledgements

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- ▶ **It is supported by the National Mission on Education through ICT, MHRD, Government of India**
- ▶ **More information on this Mission is available at**

<http://spoken-tutorial.org /NMEICT-Intro>

