

# *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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**16 November 2016**



# 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](http://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



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- ▶ **An object when immersed in water will displace water**



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



# Archimedes' Principle



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- ▶ **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:

**Density=mass/volume**

Liquid	Mass (m)	Volume (V)	Density= m/V
A-1	126.0 g	100 mL	$126/100=1.26$ g/mL
A-2	85.0 g	100 mL	$85/100=0.85$ 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](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](mailto: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

- ▶ **Spoken Tutorial Project is a part of the Talk to a Teacher project**
- ▶ **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>

