Subject : Science

Grade : 9

Term : 2nd Term

Unit : 11 – Density

Competency level : 3.5 competency level is covered in this section

- Explain the relationship between the mass and volume of a liquid through an activity.
- Introduce density as the mass per unit volume
- Solve questions related to density using $\frac{Mass}{Volume}$

- Create a simple hydrometer and uses it to compare the densities of various liquids

- Indicate examples for the instances where the concept of density is used in the events of everyday life.

Activity 1

Following diagram depicts an activity that can be conducted to demonstrate that different liquid shows different masses although volumes are equal. Complete the following table based on the observations gathered by doing the activity.

Scale Empty glass Mug Water Coconut oil Kerosene Salt solution

Steps: 1. Measure the weight of empty glass.

2. Put each solution into the glass separately and measure their weight.

3. In order to measure the weight of each solution deduct the weight of glass from each value.

Mass of the liquid/solution= Mass of the glass with the liquid – Mass of the glass

- Mass of the empty glass: 200g
- Mass of the glass with the liquid = 305 g
- Mass of the liquid/solution= 305 g – 200 g
  = 105 g
- $\frac{Mass}{Volume}\frac{105\ g}{100\ ml}$ = 1.05 g cm^{-3}

	Solution	Volume of the solutions	Mass of the glass with the liquid	Mass of solution/ liquid	$\frac{Mass}{Volume} = \frac{(m)}{(v)cm^3}$
1	Salt solution	100 ml	305 g	105 g	$\frac{105\ g}{100\ cm^3}$ = 1.05 g cm^{-3}
2	Water	100 ml	300 g	…….. g	$\frac{100\ g}{100\ cm^3}$ = …. g cm^{-3}
3	Coconut oil	100 ml	295 g	…….. g	$\frac{95\ g}{100\ cm^3}$ = 0.95 g cm^{-3}
4	Kerosene	100 ml	270 g	…….. g	$\frac{70\ g}{100\ cm^3}$ = ……. G cm^{-3}

1. Name the physical quantity which is defined by mass per unit volume?

……..

2. Write an expression for the above quantity.

……..

3. Write the standard unit to measure the density.

……..

4. Write another unit used to measure the density.

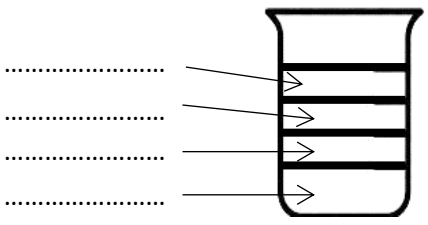
……..

5. Find the mass of an object in which the density is 200 kg m^{-3} and volume is 5 m^{-3}.

…….

You may have observed that oil floats on water.

Accordingly, the diagram given below shows the arrangement of the above liquids when put into a beaker. Name them.



A Kerosene
B Coconut oil
C Water
D Salt solution

Conclusion

……

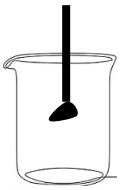
……

Activity 2

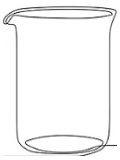
Making a simple hydrometer

Step 1 : a drinking straw, clay, a cup of water, a cup of kerosene, a cup of coconut oil (Take 150 ml)

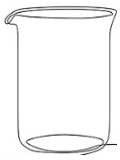
Step 2 : Fix some clay to one end of the drinking straw as in the figure given below and immerse it in different liquids.



I. According to that draw the position of the hydrometer you made in the diagrams given below.



Kerosene



Coconut oil

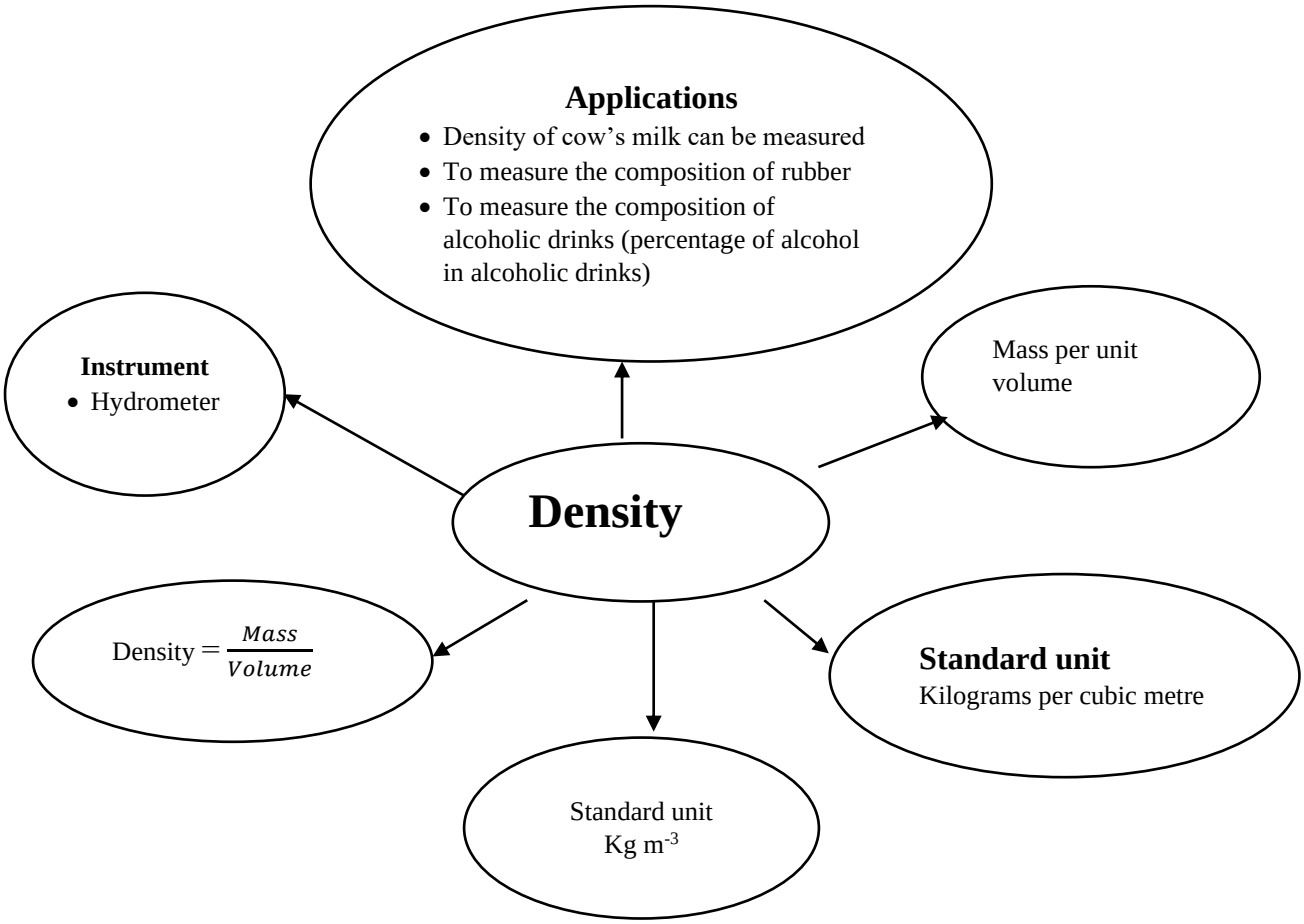
II. Name three instances where you can use hydrometer.

1. ……..

2. ……..

3. ……..

Summary



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