

Density, Temperature, and Convection Practice

Use what you have learned in class to answer the following questions related to density, temperature, and convection. For any calculations, show all work and label your answer with the correct units.

1. Fill in the blanks in the following statements: The _____ of an object is a measure of the amount of matter in that object, whereas its _____ is a measure of the amount of space taken up by the object. The object's _____ is a ratio comparing the previous two quantities, giving a measurement of how tightly the matter in the object is packed together.

$$\rho = m / V$$

2. Use the formula to the left to calculate the density of a chunk of metal that has a volume of 102cm^3 and a mass of 890g . (Be sure to show all work and state units on your final answer.)
3. Calculate the density of a 35g rock sample that has a volume of 4.2 cm^3 .
4. A certain sample of oil has a density of 0.8 g/mL . Calculate the mass of a 250mL sample of this oil.
5. A 300cm^3 sample of rock has a density of 5.2 g/cm^3 . What is the mass of this sample?

6. A student in a science experiment has two graduated cylinders full of two different liquid substances. Her sample of Substance A has a mass of 200g and volume of 250mL, while the sample of Substance B has a mass of 30g and volume of 32mL. If she pours these two substances together in a beaker, which substance will float on top? (Show calculations to support your answer.)

7. Use the words “**increases**” or “**decreases**” in the blanks to complete each statement correctly.

The volume of a sample tends to increase when its temperature _____.

The density of a sample tends to increase when its temperature _____.

If the temperature of one part of a fluid _____, that part will float upward.

8. In a class experiment, a sample of water is taken through a change in temperature, which has the effect of changing the sample’s density.

- a. Complete the data table by calculating the density of the sample in its initial and final state. Show your work below, and be sure to include units on your answers in the table.

	Mass	Volume	Density
Initial	78.9 g	81.2 mL	
Final	78.9 g	79.4 mL	

- b. Was the sample heated or cooled during the experiment? How can you tell for sure, based on the data you were given?