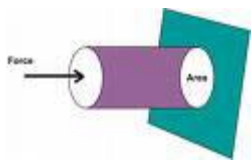


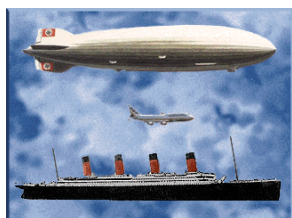
Practicing Understanding and Converting Among Units of Pressure, Volume, and Temperature



Units of Pressure

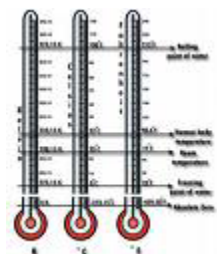
1. A common pressure for tires on a car is 35 p.s.i. Use dimensional analysis to convert that number to kilopascals, atmospheres, torr, and mmHg.
2. The weather forecaster on the evening news says that the barometer shows 30.1 inHg and it's falling. Convert this air pressure to mmHg, torr, and atm.
3. "The diesel engine has no sparking plug. At the end of the compression the fuel is forced into the cylinder under high pressure. The temperature is so hot that the fuel burns as soon as it has mixed into the air. When it burns, the temperature inside the cylinder reaches about 2500°C and the pressure is about 100 atmospheres (10 MPa)."
<http://ncert.nic.in/sites/learning%20basket/energy10class/combustion%20engine1.htm>

Convert the pressure inside the cylinder of a diesel engine to mmHg and kPa.



Units of Volume

4. The German airship *Hindenburg* held 7,062,000 cubic feet of hydrogen (<http://www.ciderpresspottery.com/ZLA/greatzepts/german/Hindenburg.html>). In retrospect, this was probably not a very good idea. A party balloon holds about 7 liters. How many "party balloons" would you have to fill to have an equivalent amount of helium gas as there was hydrogen in the *Hindenburg*?
5. A "big" motorcycle has an engine capacity of 1200 cubic centimeters. Convert this number to liters and cubic inches. How does this size engine compare to the 1989 Geo Metro I owned in college? It had a one liter engine.



Units of Temperature

6. "Vostok station (Russian) NEW RECORD SET IN 1997!!! This is an unconfirmed report from Vostok Station during the winter of 1997. -91 °C. This is colder than Dry Ice! The "official" record is also from Vostok station on July 21, 1983 -89.2 °C)" (<http://hypertextbook.com/facts/2000/YongLiLiang.shtml>)

Convert the record set in 1997 and the official record to units of K and units of degrees F.

7. "(Dr. James Bedford, a 73-year-old psychologist from Glendale, was suspended on January 12, 1967), it's not so far-fetched to imagine that Disney might have made similar arrangements." (www.snopes.com) Cryogenic freezing involves placing a dead human body in liquid nitrogen. The temperature of liquid nitrogen is 77.2 K. Convert that to degrees Celsius and degrees Fahrenheit.