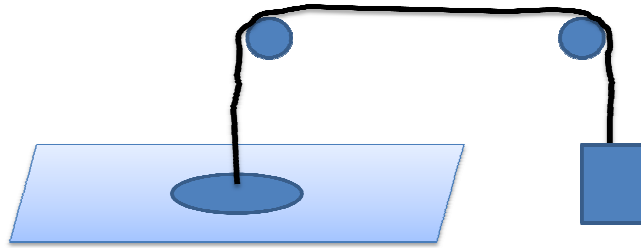
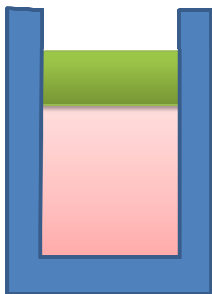


### Pressure and Thermodynamics Reading questions:

- 1) How many cubic centimeters are in  $1\text{m}^3$ ?
- 2) How many atoms are in  $1\text{m}^3$  of helium at 20 degrees Celsius and pressure 101 kPa?
- 3) What is the average speed of the helium molecules?



- 4) A perfect suction cup of radius 10cm (with no air pressure below it and ordinary atmospheric pressure above) is stuck to a table and attached by a rope and pulleys to a weight. How much mass can the weight have before the suction cup will pull off the table?



- 5) Gas in a cylinder of radius 5cm is trapped by a 10kg weight that is free to move up and down. If the air outside the cylinder is at ordinary atmospheric pressure, what is the pressure of the gas in the cylinder (hint: there are three forces on the block, and the net force is zero)?
- 6) a) The gas in the cylinder in the previous question is heated, from 20 degrees Celsius to 40 Degrees Celsius. Does the pressure of the gas change?  
b) By how much does the weight move if the gas is 10 moles of Helium?  
c) How much work does the gas in the cylinder do on the weight?