

23. • Oxygen (O_2) has a molar mass of 32.0 g/mol . (a) What is the root-mean-square speed of an oxygen molecule at a temperature of 300 K ? (b) What is its average translational kinetic energy at that speed?
24. • Suppose some insects have speeds of 10.00 m/s , 8.00 m/s , 7.00 m/s , and 2.00 m/s . Find (a) the rms speed of these critters and (b) their average speed.
37. • A metal cylinder with rigid walls contains 2.50 mol of oxygen gas. The gas is cooled until the pressure decreases to 30.0% of its original value. You can ignore the thermal contraction of the cylinder. (a) Draw a pV diagram of this process. (b) Calculate the work done by the gas.
46. • Five moles of an ideal monatomic gas with an initial temperature of 127°C expand and, in the process, absorb 1200 J of heat and do 2100 J of work. What is the final temperature of the gas?