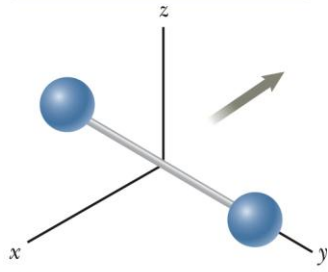
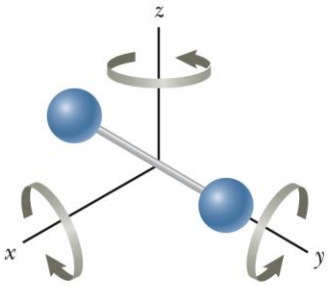


Translational motion of the center of mass



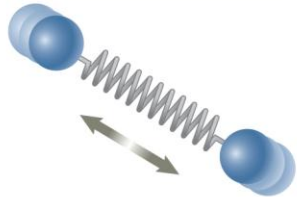
a

Rotational motion about the various axes



b

Vibrational motion along the molecular axis



c

**TABLE 21.2** Molar Specific Heats of Various Gases

Gas	Molar Specific Heat (J/mol · K) <sup>a</sup>			$\gamma = C_p/C_v$
	$C_p$	$C_v$	$C_p - C_v$	
<i>Monatomic gases</i>				
He	20.8	12.5	8.33	1.67
Ar	20.8	12.5	8.33	1.67
Ne	20.8	12.7	8.12	1.64
Kr	20.8	12.3	8.49	1.69
<i>Diatomic gases</i>				
H <sub>2</sub>	28.8	20.4	8.33	1.41
N <sub>2</sub>	29.1	20.8	8.33	1.40
O <sub>2</sub>	29.4	21.1	8.33	1.40
CO	29.3	21.0	8.33	1.40
Cl <sub>2</sub>	34.7	25.7	8.96	1.35
<i>Polyatomic gases</i>				
CO <sub>2</sub>	37.0	28.5	8.50	1.30
SO <sub>2</sub>	40.4	31.4	9.00	1.29
H <sub>2</sub> O	35.4	27.0	8.37	1.30
CH <sub>4</sub>	35.5	27.1	8.41	1.31

<sup>a</sup> All values except that for water were obtained at 300 K.

