

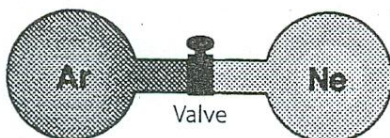
Figure 8-9. **Entropy:** Entropy is a measure of disorder or randomness.

Review Questions

36. Which change in a sample of water is accompanied by the greatest increase in entropy?

- (1) $\text{H}_2\text{O}(\ell)$ at 100°C is changed to $\text{H}_2\text{O}(g)$ at 200°C
- (2) $\text{H}_2\text{O}(g)$ at 100°C is changed to $\text{H}_2\text{O}(g)$ at 200°C
- (3) $\text{H}_2\text{O}(s)$ at -100°C is changed to $\text{H}_2\text{O}(s)$ at 0°C
- (4) $\text{H}_2\text{O}(s)$ at 0°C is changed to $\text{H}_2\text{O}(\ell)$ at 0°C

38. The diagram below shows a system of gases with the valve closed.



As the valve is opened, the entropy of the gaseous system

- (1) decreases
 - (2) increases
 - (3) remains the same
39. Which series of physical changes represents an entropy increase during each change?
- (1) gas \rightarrow liquid \rightarrow solid
 - (2) liquid \rightarrow gas \rightarrow solid
 - (3) solid \rightarrow gas \rightarrow solid
 - (4) solid \rightarrow liquid \rightarrow gas
40. Which tendencies favor a spontaneous reaction?
- (1) lower energy and decreasing entropy
 - (2) lower energy and increasing entropy
 - (3) higher energy and decreasing entropy
 - (4) higher energy and increasing entropy

37. What occurs when a sample of $\text{CO}_2(s)$ changes to $\text{CO}_2(g)$?

- (1) The gas has greater entropy and less order.
- (2) The gas has greater entropy and more order.
- (3) The gas has less entropy and less order.
- (4) The gas has less entropy and more order.

41. Consider the following equation.



Which will occur if the temperature of the system is increased?

- (1) The average kinetic energy of the system will decrease.
 - (2) The entropy of the system will increase.
 - (3) The number of moles of $\text{H}_2\text{O}(g)$ will decrease.
 - (4) The number of moles of $\text{H}_2\text{O}(\ell)$ will increase.
42. As $\text{NaCl}(s)$ dissolves according to the equation $\text{NaCl}(s) \rightarrow \text{Na}^+(aq) + \text{Cl}_2(aq)$, the entropy of the system
- (1) decreases
 - (2) increases
 - (3) remains the same
43. Which change results in an increase in entropy?
- (1) $\text{H}_2\text{O}(g) \rightarrow \text{H}_2\text{O}(\ell)$
 - (2) $\text{H}_2\text{O}(s) \rightarrow \text{H}_2\text{O}(\ell)$
 - (3) $\text{H}_2\text{O}(\ell) \rightarrow \text{H}_2\text{O}(s)$
 - (4) $\text{H}_2\text{O}(g) \rightarrow \text{H}_2\text{O}(s)$
44. A reaction must be spontaneous if its occurrence is
- (1) endothermic with an increase in entropy
 - (2) endothermic with a decrease in entropy
 - (3) exothermic with an increase in entropy
 - (4) exothermic with a decrease in entropy