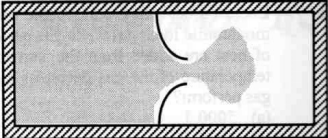


KC's Multiple Select

Entropy and 2nd Law of Thermodynamics

- *Thermodynamics.Entropy-2nd-Law.MS.KC.1:* Two equal sized chambers are separated by a movable divider but the entire system is isolated otherwise. On side **A** there is 3 moles of CO_2 at 96°F and on side **B** there is 2 moles of CO_2 at 22°F . The divider is removed. Which of the following statements are true regarding the time after the divider is removed?
 - (a) The whole system begins and remains in total equilibrium.
 - (b) The entropy of side A decreases while the entropy of side B increases.
 - (c) The entropy of side A increases while the entropy of side B decreases.
 - (d) The entropy of both side A and side B both increase.
 - (e) The entropy of both side A and side B both decrease.
 - (f) The magnitude of the entropy change for both side A and side B are equal.
 - (g) The magnitude of the entropy change for side A is less than that of side B.

 - *Thermodynamics.Entropy-2nd-Law.MS.KC.2:* A thermally insulated sample of an ideal gas at a fixed temperature is confined to one half of a container by an impermeable membrane. The other half of the container is evacuated. The membrane is then pierced and the gas is allowed to expand freely and to double its volume as shown. Which one of the following statements is true concerning this situation?
 - (a) The process is reversible.
 - (b) This is an isothermal process.
 - (c) The entropy of the gas decreases.
 - (d) The internal energy of the gas must decrease.
 - (e) The temperature of the gas decreases to one-half of its original value.
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- The diagram shows a rectangular container divided into two equal halves by a vertical membrane. The left half is shaded gray, representing a gas. The right half is white, representing a vacuum. The membrane is shown in a dashed position, indicating it has been removed. The gas is now expanding to fill the entire container.

- Thermodynamics.Entropy-2nd-Law.MS.KC.4:* A gas, confined to an insulated cylinder, is compressed adiabatically to half its volume. Which of the following statements are true regarding this situation?

 - (a) The entropy of the gas increases.
 - (b) The entropy of the gas decreases.
 - (c) The entropy of the gas remains constant.
 - (d) The average kinetic energy of the molecules in the gas increases.
 - (e) The average kinetic energy of the molecules in the gas decreases.
 - (f) The average kinetic energy of the molecules in the gas remains constant.
- Thermodynamics.Entropy-2nd-Law.MS.KC.5:* Molten lead is poured into a mold to make a tool. As it cools and hardens, which of the following statements are true?

 - (a) The entropy of the lead decreases more than the surrounding environment's entropy increases.
 - (b) The entropy of the lead decreases less than the surrounding environment's entropy increases.
 - (c) The entropy of the lead increases while the surrounding environment's entropy remains constant.
 - (d) The entropy of the lead + environment increases.
 - (e) The entropy of the lead + environment remains constant.
- Thermodynamics.Entropy-2nd-Law.MS.KC.6:* Water is placed in a freezer and as it comes into thermal equilibrium it freezes. Which one of the following statements is true concerning this process?

 - (a) The water gains entropy in accord with the second law of thermodynamics.
 - (b) The water loses entropy so the process violates the second law of thermodynamics.
 - (c) The water gains entropy, but the air outside the freezer loses entropy in accord with the second law of thermodynamics.
 - (d) Both the water and the air outside the refrigerator lose entropy, but the universe gains entropy in accord with the second law of thermodynamics.
 - (e) The water loses entropy, but the air outside the refrigerator gains entropy in accord with the second law of thermodynamics.
- Thermodynamics.Entropy-2nd-Law.MS.KC.7:* An isolated chamber is split into two sides by a divider and side 1 has no air while side 2 is full of air. The divider is removed. Compare the initial and final state from before the divider was removed to long after, when the system has reached equilibrium. Which of the following statements are *false*.

 - (a) The entropy of the entire system has decreased.
 - (b) The entropy of the entire system has increased.
 - (c) The entropy of side 1 has increased.
 - (d) The entropy of side 2 has increased.
 - (e) The entropy of side 2 has decreased.
 - (f) The thermal energy of the entire system will remain a constant.
 - (g) The thermal energy of the entire system will increase.
 - (h) The average temperature of the entire system will remain a constant.