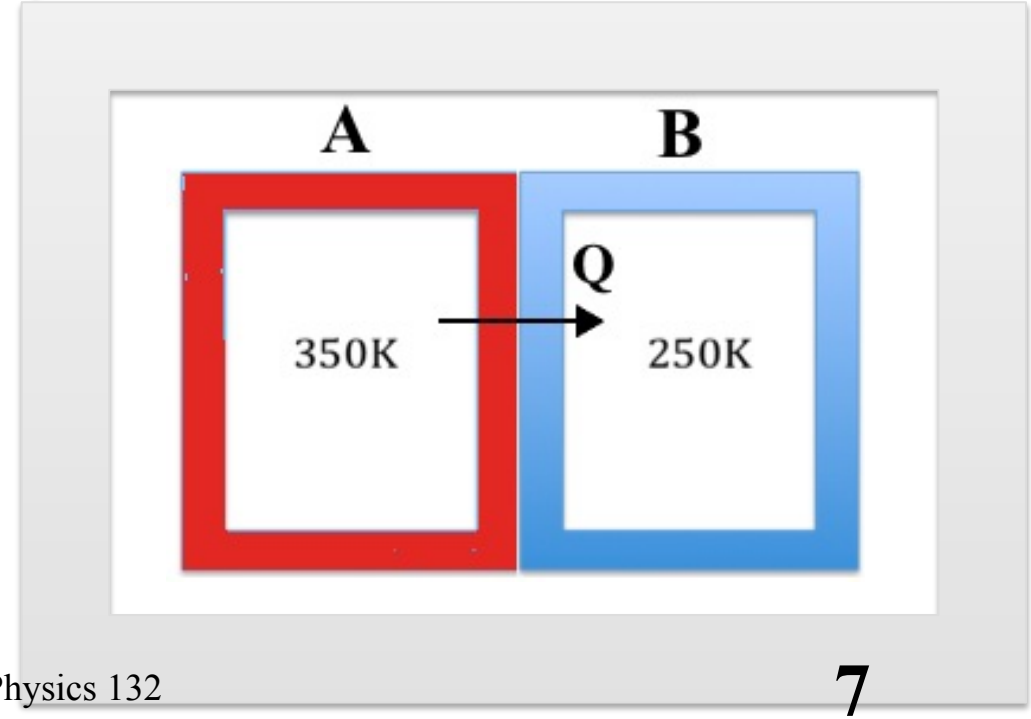
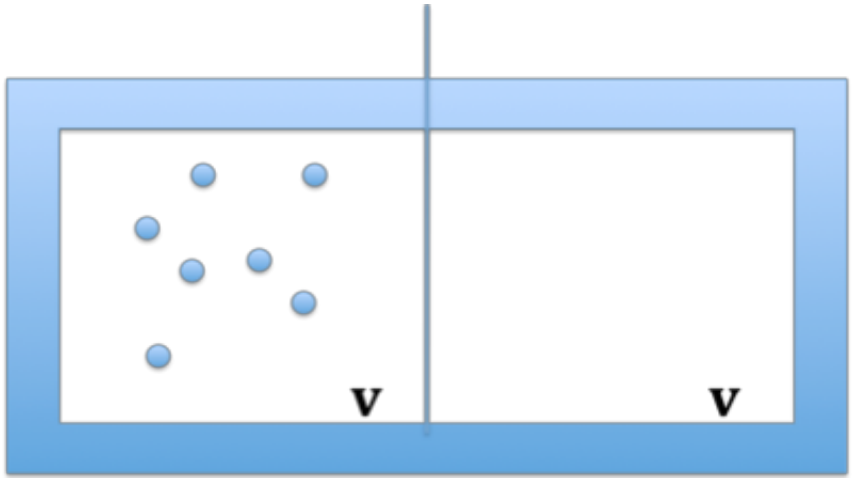
A small amount of heat Q flows out of a hot system A (350K) into a cold system B (250K). Which of the following correctly describes the entropy changes that result? (The systems are thermally isolated from the rest of the universe.)

1. $|\Delta S_A| > |\Delta S_B|$
2. $|\Delta S_B| > |\Delta S_A|$
3. $|\Delta S_A| = |\Delta S_B|$
4. It cannot be determined from the information given



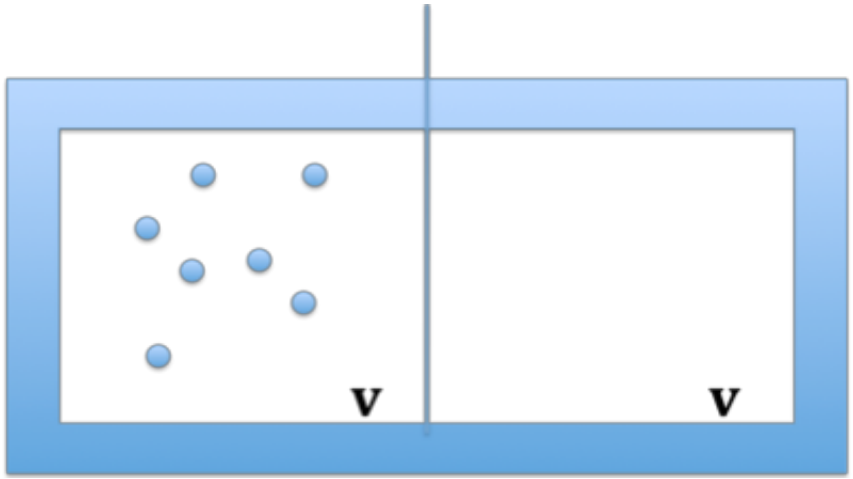
Suppose an isolated box of volume $2V$ is divided into two equal compartments. An ideal gas occupies half of the container and the other half is empty. When the partition separating the two halves of the box is removed and the system reaches equilibrium again, how does the new **internal energy** of the gas compare to the internal energy of the original system?

1. The energy increases
2. The energy decreases
3. The energy stays the same
4. There is not enough information to determine the answer



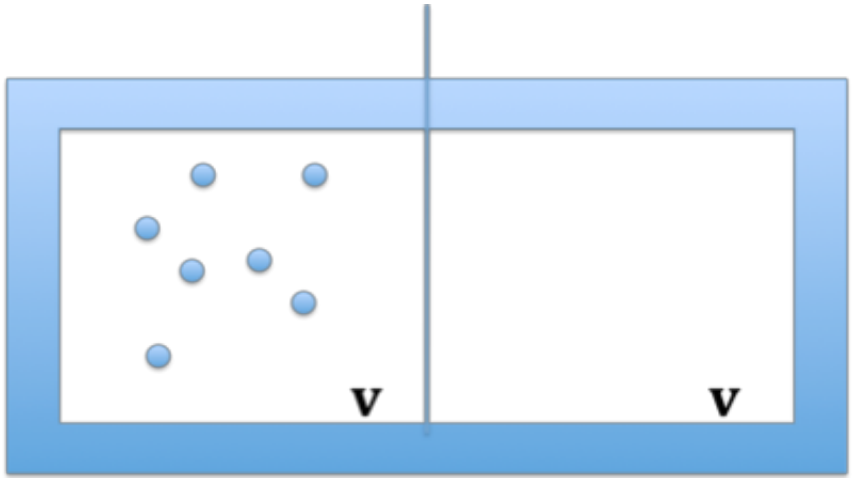
Suppose an isolated box of volume $2V$ is divided into two equal compartments. An ideal gas occupies half of the container and the other half is empty. When the partition separating the two halves of the box is removed and the system reaches equilibrium again, how does the new **pressure** of the gas compare to the **pressure** of the original system?

1. The pressure increases
2. The pressure decreases
3. The pressure stays the same
4. There is not enough information to determine the answer



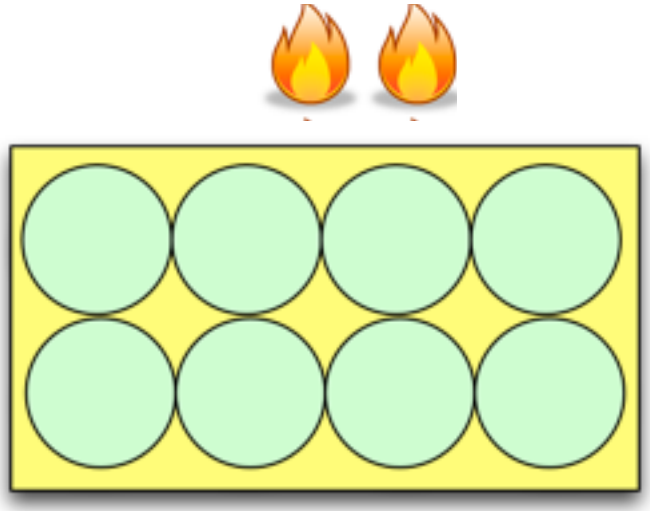
Suppose an isolated box of volume $2V$ is divided into two equal compartments. An ideal gas occupies half of the container and the other half is empty. When the partition separating the two halves of the box is removed and the system reaches equilibrium again, how does the new **entropy** of the gas compare to the entropy of the original system?

1. The entropy increases
2. The entropy decreases
3. The entropy stays the same
4. There is not enough information to determine the answer



Suppose I have a block of matter with 8 two-state "Degrees of Freedom" (bins in which to place energy that can only hold 1 energy packet).

I have 2 packets of thermal energy. How many ways are there to distribute 2 packets? *(i.e., How many microstates are there?)*



1. 16
2. 15
3. 8
4. 64
5. 56
6. 32
7. 28
8. Something else
9. It cannot be determined