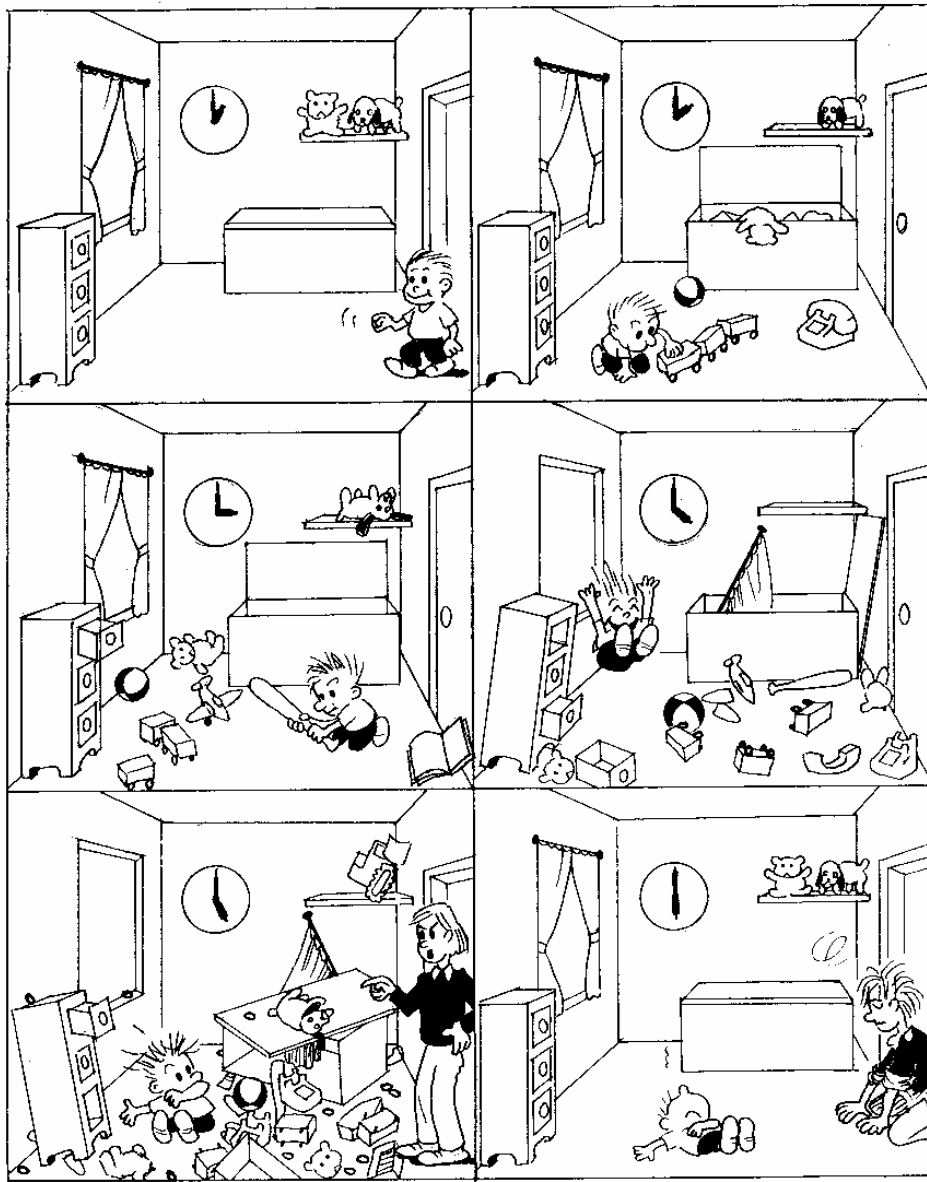


ENTROPY AND THE SECOND LAW OF THERMODYNAMICS

The Second Law is often expressed in terms of the amount of "order" or "disorder" of a system, where "order" is associated with low probability (unlikely), regular arrangements of the elements that make up the system and "disorder" is associated with high probability (likely), mixed up arrangements of the elements.

In the study of thermodynamics, the concept of disorder is quantified: "entropy" is a quantitative measure of the extent of disorder of a system. A highly mixed up, disordered (high-probability) system has a high entropy, whereas a highly ordered (low-probability) system has relatively lower entropy.



The Second Law – also known as the Law of Entropy – states that the direction of spontaneous change of an isolated system resulting from random interactions of its elements is from "order" (low probability) towards "disorder" (higher probability). This is because there are many more ways to achieve disorder than there are to achieve order. In terms of entropy, this corresponds to a natural tendency of an isolated system to evolve in the direction of increasing entropy. This might be called the "homemaker's rule": a child's bedroom "naturally" becomes disordered as a result of the "random" interactions of the child with his toys. The reverse processes – the spontaneous tidying up of the room – is highly unlikely to ever occur. Order in the room can be restored, however, by an external influence (a mother), but at the expense of an increase in entropy of the mother and child, so that the *total* entropy of the room plus mother and child increases.