1. For 450 atoms and 0.28 density, the atoms are solid for the temperature range from 0.0 to around 0.42. The atoms remain in liquid phase from temperature 0.42 to 0.67. After increasing the temperature from 0.67 it was hard to differentiate between the liquid phase and the gas phase, so I guess the atoms behave in the gas phase from temperature 0.67.
2. Starting with random configuration of the atoms (450 atoms and 0.28 density), the atoms are arranged in random clusters. While increasing the temperature from 0.0 to 2.0, the orientation of the atom gets more random which is kind of similar to that of the gas phase. So, increasing the temperature does not help with getting the HCP orientation from random as increasing the temperature will just increase the energy of the atoms which will cause the atoms to move more rapidly.

If we start the random configuration from high temperature and then decrease the temperature to 0.0 the atoms will form into a cluster but again it’s not in the form of HCP structure, rather it will form some random disoriented structure. Decreasing the temperature slowly, gets the final orientation a bit more organized than the former but still doesn’t help to get the HCP structure. The reason for this might be because decreasing the temperature, decreases the energy of the atoms but not necessarily forms them into a particular structure. Rather they will just stop moving and form a random structure.

1. The lowest energy per particle varies as per the atomic configuration. If we start with the random configuration of atoms (450 atoms and 0.28 density) the lowest energy per particle is around -14.7 while if we take the HCP configuration the lowest energy per particle is around 0.0. For both of the cases the energy will increase as the temperature is increased. The reason for the different values of the energies is that the atoms are oriented differently from each other in both of the cases and as the atoms tries to minimize its energy its energy is low at the beginning (at low temperatures.). Moreover, as the energy of the atoms solely depends on its distance from other atoms, the energy of HCP is more compared to that of the random orientation (the atoms are more clustered and hence have higher energy).
2. Yes, the temperature for the atoms to become gas from solid does depend on the number of atoms. If we start with 7 atoms and 0.32 density the lowest energy per particle is around -3.7 while for the same density and 400 atoms the lowest energy per particle is around -15.1 (which is lower than the smaller number of atoms). So, as we decrease the number of atoms, the energy increases because of the LJ potential and hence it would require less temperature increase to convert them into the gas phase.