The following two videos introduce pulse NMR

This video illustrates the spin echo

Spins in the horizontal plane relax back into thermal equilibrium oriented along +z
The relaxation is exponential and is given by exp(-time / T2)
http://www.magritek.com/support-videos#06
or http://www.youtube.com/watch?v=B2HMAJQJ7ok

This video describes measuring the longitudinal relaxation time T1 and the transverse relaxation time T2

Spins aligned along -z relax back into the the equilibrium orientation along +z
The relaxation is exponential and is given by exp(-time / T1)
http://www.magritek.com/support-videos#07
or http://www.youtube.com/watch?v=753GoKV1F4Y

The following four animations show the evolution of the spins in the rotating frame

This animation shows the transverse relaxation of the magnetization

The equilibrium orientation of the magnetization is parallel to the +z-axis
If you put it in any other direction, it will relax until it is again parallel to the +z-axis
The magnetization starts in the horizontal plane
The magnetization then spirals up from the horizontal plane eventually reaching the +z-axis
Where does the energy go? It turns into heat.
http://mutuslab.cs.uwindsor.ca/schurko/nmrcourse/animations/eth_anim/Bloch_normal.gif

This animation shows what happens when the transverse relaxation time T2 is short compared to above

http://mutuslab.cs.uwindsor.ca/schurko/nmrcourse/animations/eth_anim/Bloch_shortT2.gif

This animation shows the evolution of the magnetization after a 90 degree pulse

Before the pulse, the magnetization is vertical---in thermal equilibrium along +z
The 90 degree pulse moves the magnetization from vertical to horizontal along the cyan arc
The horizontal magnetization relaxes back to vertical along the red spiral
http://mutuslab.cs.uwindsor.ca/schurko/nmrcourse/animations/eth_anim/puls_evol.gif

This animation shows the classic Hahn spin echo

Before the pulse, the magnetization is in equilibrium along +z
At t=0, a 90 degree pulse is applied
This moves the magnetization into the horizontal plane
The magnetization in the horizontal plane starts to dephase
This is because the spins in different locations have different precession frequencies
This is usually due to magnetic field inhomogeneities
After the fan of spins has spread out, an 180 degree pulse is applied
This puts the fast precessing spins "behind" the slow precessing spins
Consequently the fan of spins collapses/rephases and produces the spin echo
The collapse occurs after the same amount of time that the spins were allowed to spread out
http://mutuslab.cs.uwindsor.ca/schurko/nmrcourse/animations/eth_anim/hahnecho.gif

The following four animations show the evolution of the spins in the lab frame

http://www.youtube.com/watch?v=IKp67IqQjH4 shows the return to equilibrium following a 90 degree pulse
http://www.youtube.com/watch?v=is8TscwFOvM shows the dephasing of the spins in the horizontal plane
http://www.youtube.com/watch?v=_7oZMA0OuK4 shows the top view of the previous animation
http://www.youtube.com/watch?v=GDEIT6Tz7_Q shows the rephasing of the spins produced by a 180 degree pulse

http://en.wikipedia.org/wiki/Relaxation_(NMR) describes T1 and T2 and shows an animation of the spin echo