5.) N-type semiconductors are doped to have more electrons in the conduction band. This means E_F is higher than in pure Silicon

P-type semiconductors are doped to have more holes in the valence band. This means E_F is lower than in pure silicon.

When a piece of P-type is joined to a piece of N-type, a contact potential forms. The P-type ends up at higher potential energy as a result.

Forward biasing pushes the plentiful N-type conduction electrons over the contact potential. Current flows freely.

Reverse biasing pushes whatever P-type conduction electrons there are toward the N-type side. Arent many P-type conduction electrons. Small amount of current (effectively none) flows.