1. One can think of electric potential as something that increases the height of a wooden plank at one end - lifting it at one end above ground. Here the ground is similar to the electrical ground.
2. Now, imagine that we place a bunch of balls at the tall end of the plank. If it is smooth and flat, the balls will roll to the ground more or less at the same speed no matter the angle of the plank
3. Instead of being flat throughout, suppose the plank has a speed breaker in the middle. The balls will hit the speed breaker, loose some energy in climbing it up and then roll the ground. They will roll slower than they would if the plank was flat.
4. The height of the speed breaker represents resistance. The no. of balls crossing a point within a given time is current.
5. Imagine a water tank in the terrace with a long pipe going to the ground. Gravitational force is a like a constant force applied on the water surface at the top of the tank.
6. Resistor is like a pinch or choke point along the pipe. The diameter of the choke is the resistance. Now the pipe itself has a diameter - so it has an inherent resistance. This is like the resistance a piece of wire has.It is still there, but it is negligible
7. If the pipe has no pinch and the bottom just drains into the ground, it is like an electrical system where a battery is connected to the ground using a wire. All the water will simply drain into the ground. One can think of water flow as current: To be accurate, the Cuboids (volume) of water moved per second is similar to the Coloumbs of charge moved per second. The water draining to the ground will be fast, but will still take a finite time. In other words, the current won’t be infinite - This is, again, because the pipe diameter isn’t infinite and it hence has a resistance and water flow is limited to a finite value
8. Pinching the pipe completely is like introducing an infinite resistance. The water flow cannot happen - Due to Newton’s third law, the pinch will apply an equal, but opposing force and the water hence cannot move. This is similar to how the open end of a circuit develops the same voltage as the battery’s positive terminal and in the opposite direction no matter any other resistances along the way.
   1. If one thinks of a toilet telephone water shooter, when the lever isn’t pressed, no matter how much the tap below is closed, the telephone area will feel the same force. Only when the lever is pressed, and water is flowing, does the amount of tap closure (or resistances in the system) have any meaning.
9. One can think of this whole water tank + pipe setup being taken into space where there is no gravitational force. In this case, unless someone puts a piston+disk assembly on the water surface on the tank and pushes the piston down, current wont flow. Without the piston+disk in picture, end of the pipe and the water surface on the tank are at the same potential as there is no “up” or “down” in the absence of gravity.
10. When the piston is plunged it applies force on one end of the water pipe. Current, a.k.a. Water flow will happen - water molecules will simply come out of the other end of the tube and go into space.
11. Instead of having a pipe opened out to space, one can think of a pipe in a loop with still water in it. But now we *cannot* attach a piston to apply a voltage. Instead, we have have a motor embedded inside the pipe to apply a force.
12. Now if the motor is run, a force (or voltage) will be generated that will circulate the water inside the closed loop. In this scenario, there is not such a thing as a “ground”.
13. Capacitor is like two disks fit inside the drum with some fluid between the disks. Now, if this drum assembly is fit inside the closed loop pipe at a certain point and the motor is turned on, initially the motor will push the water, which will push the disk on the drum assembly, which will cause the other disk to push out water at its end. In other words, through out the loop, there will be a flow of water. However when the other disk reaches the end of the drum, pressure will build up until it opposes the force applied on the business end of the drum by the dc motor - eventually the opposing force will be same as the force from the motor. In other words, the current will first flow as if there was no drum/capacitor, but eventually the capacitor will develop the same potential as the battery and the current will stop.
14. Inductor is like a fan. If it is place inside our close loop pipe and the motor is turned on, initially the fan won’t want to rotate causing an equal but opposing force on the motor - but only for a tiny fraction of a second. No current will flow in the pipe at this point (Remember that the pipe is jam-packed with water). But the fan will start turning, initially with great reluctance, but gradually loosening up. This is akin to an inductor letting current through it, slowly at first and gradually increasing. Eventually the fan will completely loosen up - it will be as it there was no fan in the water loop. The water flow will feel no back pressure from the fan blades. This is like an inductor having no potential across it after some point.
15. No disc+drum assembly will have zero friction to the disc movement. Similarly, no fan will rotate will zero reluctance ever, because, no matter how smooth the ball bearings are, there is always some friction. This is why there no pure capacitors or inductors - all have some inbuilt resistance as well.
16. Applying AC voltage in a closed loop system, is like applying AC voltage to that DC motor - It is going to keep turning one way and then the other way. If the water pipe had only resistors, this is fine - it will simply cause water to flow in one direction and then in the opposite direction. But a capacitor or an inductor will behave differently. In a capacitor, when water always in one direction, eventually the business-end disc developed equal and opposite potential and the water flow stopped. But now, one disc will be pushed for sometime followed by a push on the other disc. The discs will simply move back and forth and the current will keep flowing as if there was a just a resistor. Of course, this resistance will be different at different push-pull rates of the discs and hence the capacitor has a different resistance at different AC frequencies.
17. The inductor, i.e., the fan, in the case of a uni-directional water flow eventually loosened up completely and the water was flowing as if there was no fan in the pipe. Now, with AC force, just as the fan starts rotating in one direction, it will be asked to move in the other direction. If the AC frequency is slow enough, the fan will do it, although with resistance, but if it is high, the fan would have not even started moving in one direction when the water flow applies pressure in the other direction - basically it will develop a very high resistance.
18. In a DC water loop, with a fan, if the motor stops after a while, the fan will still want to keep rotating - this is like an inductor trying to keep current flow same (in the same direction). If we have a capacitor there, the moment the motor stops, the capacitor will push back on the water in the opposite direction.
19. One can also think of gears as transformers. In this case, rpm will be current (angular velocity) and torque as voltage. When a small gear is connected to a large gear, the high rpm and low torque of the rod connected to the small gear will get transformed into the low rom and high torque of the rod connected to the large gear.