Artificial Gravity is a simulated gravity established within a space vehicle by rotation or acceleration, but also it can be done on Earth. It can be practically achieved by the use of some different forces, particularly the centrifugal force.

The only way to create a nearly realistic feeling of weight would be to create a spinning space station or shuttle.

If a station was created like the one in the attachment, while it is spinning, the wall of the space station would apply a center seeking (centripetal) force on the person to keep them traveling in a circular path. The wall of this station has to exert that force (which also happens to be a normal force) because if it didn't, the person would continue moving in straight-line motion. That's what things do in the absence of a net force. " Up" would be seen as toward the center of the station.

The acceleration felt by the astronaut would be the centripetal acceleration which is described by the formula $a_c = \frac{v^2}{r}$. The faster the space station spins the greater the centripetal acceleration felt by the person. The larger the radius of the space station the smaller the centripetal acceleration. By adjusting the rotational velocity (v) of the space station we could literally adjust the amount of the simulated gravity. If adjusted to just the right velocity, the centripetal acceleration would equal the acceleration due to gravity on Earth ($a_c = g$) which means we would be simulating the amount of gravity felt on Earth. Any person in the space station would feel the same amount of force pushing on the bottom of their feet as they would if they were standing on Earth.

The faster the space station spins the greater the centripetal force needed to keep the person in a circular path. The larger the radius of the space station the smaller the centripetal force.

Medical studies of astronauts exposed to long periods in orbit show serious declines in their bone strength, muscular tone and in their cardiovascular conditioning. There is also documented evidence for a decrease in the efficiency of the body's immune system.

The body generally recovers quickly when the force of gravity returns but bone decalcification takes a long time to recover. Also, in a free-fall environment, (where there are no specific directions of "up" or "down"), there are many minor inconveniences that range from the inability to drink liquids from a cup to using the toilet or taking a shower. For very long space missions these minor problems can become sources of major discomfort and annoyance adding to the psychological pressures of isolation and limited space. To avoid some of the physiological and psychological problems created by long term exposure to the free-fall conditions associated with space travel, a simulated gravitational environment must be provided for humans traveling in space. The only way to duplicate the effect of being at rest in a gravitational field is to provide an accelerated environment that simulates gravity and a uniformly rotating environment does this very nicely.