Beginning with a review of the basic principles of general relativity, which is Einstein's theory of gravitation, we go on to discuss the black holes that describe the endpoint of the gravitational collapse of sufficiently massive bodies. This purely classical picture changes when the effects of quantum mechanics are taken into account. By making semi-classical approximations, more than forty years ago Hawking discovered his celebrated result that black holes are not black, but instead they radiate with a characteristic temperature known as the Hawking temperature. We describe how this led to a puzzle which persists to this day, known as the "information loss paradox." Resolving the puzzle requires reaching a proper understanding of quantum gravity. We outline some of the progress that has been achieved in this direction.