The most important transport processes are characterized by a simultaneous change in the amount of energy or material with time and place. For example, soil water potential plays an important role in water flow. In fact, there is a demand for a simple model to predict soil water potential. Therefore, a simplified model originally proposed by Aydin and Uygur (Accepted paper for International Symposium on Water and Land Management for Sustainable Irrigated Agriculture, 2006, Adana-Turkey) has been tested for estimating water potential of a sandy-soil. The model is based on the relations among soil water potential, soil evaporation, hydraulic diffusivity and soil wetness. In order to evaluate the performance of the model, a sandy soil column-experiment was carried out in a chamber. Soil water potentials near surface (<1 cm) for a drying period were measured by eight channels Water Potential System using soil psychrometers installed in the soil columns. Daily potential soil evaporation was directly measured with the amount of water losses from the saturated soil surface. The results clearly show that the model is valuable in estimating water potential of soils with only a few parameters. In addition, the model can be incorporated into Aydin Model (Aydin et al., Ecological Modelling 182: 91-105, 2005) to compute actual evaporation from a bare soil.