We define a new model for recognizing picture languages using picture-to-string transformations – transcriptor-evaluator machine for picture languages (TEMPL). The model consists of a transcriptor that rewrites an input picture into a string and an evaluator that accepts or rejects the obtained string. We use TEMPL as a representation of picture languages that can be learned from positive and negative examples. The attached implementation of TEMPL and several algorithms for learning regular languages were used for benchmarking the accuracy of training TEMPLs on selected picture languages.