Periodic environments are commonly observed in nature and may either enhance or suppress a population. We study the responses of two competing discretely reproducing populations to periodic fluctuations in six parameters. Two of these parameters are related to a nontrivial equilibrium (carrying capacity), two are related to the carrying capacities of the individual species in the absence of the other species and the remaining two are quite arbitrary but are usually intrinsic growth rates of the individual species. We prove that small, 2-periodic fluctuations in the six parameters support 2-cyclic oscillations of the populations. We then develop signature functions for predicting the responses of the populations to 2-periodic fluctuations in the environment. Periodic environments are favorable for the total biomass and for each species if the corresponding signature function is positive but are deleterious when the corresponding signature function is negative. We compute the signature functions for four classical discrete-time, two species population models, and then determine regions in parameter space which are either favorable or detrimental to the populations. The four 2-D models studied are Logistic, Ricker, Beverton-Holt and Hassell type models. (Received September 20, 2011)