Given a semigroup \((S, \cdot)\), Green’s left quasiorder \(\leq_L\) is given by \(a \leq_L b\) if \(a = u \cdot b\) for some \(u \in S^1\), and this quasiorder generates a principal topology on \(S\). Not every principal topology on a set \(X\) arises in this way. The purpose of this talk is to establish a one-to-one correspondence between principal topologies on a set \(X\) and appropriate transformation semigroups on \(X\) using semigroup actions. (Received September 02, 2008)