Given an abelian group $G$, it is natural to ask whether there exists a permutation $\pi$ of $G$ that “destroys” all nontrivial 3-term arithmetic progressions (APs), in the sense that $\pi(b) - \pi(a) \neq \pi(c) - \pi(b)$ for every ordered triple $(a, b, c) \in G^3$ satisfying $b - a = c - b \neq 0$. This question was resolved for infinite groups $G$ by Hegarty, who showed that there exists an AP-destroying permutation of $G$ if and only if $G/\Omega_2(G)$ has the same cardinality as $G$, where $\Omega_2(G)$ denotes the subgroup of all elements in $G$ whose order divides 2. In the case when $G$ is finite, however, only partial results have been obtained thus far. Hegarty has conjectured that an AP-destroying permutation of $G$ exists if and only if $G = \mathbb{Z}/n\mathbb{Z}$ for all $n \neq 2, 3, 5, 7$, and together with Martinsson, he has proven the conjecture for all $n > 1.4 \times 10^{14}$. In this paper, we show that if $p$ is a prime and $k$ is a positive integer, then there is an AP-destroying permutation of the elementary $p$-group $(\mathbb{Z}/p\mathbb{Z})^k$ if and only if $p$ is odd and $(p, k) \notin \{(3, 1), (5, 1), (7, 1)\}$. (Received September 09, 2016)