Let $f$ be a polynomial (of any degree) with an attracting periodic point. Suppose that $f$ is irreducible—that is, $f$ has a connected Julia set, and the dynamics of $f$ is not the product of gluing together two or more simpler polynomials. For such $f$, we provide an explicit model of the Julia set which is homeomorphic to it if and only if the Julia set is locally connected. We then state a local connectivity result for the Julia set in the case when the critical points for $f$ have non-persistently recurrent combinatorics. (Received January 12, 2019)