Let $f : X \to X$ be a dominant rational self-map of a smooth projective variety defined over $\mathbb{Q}$. The dynamical degree $\delta_f$ of $f$ is a real number that measures the dynamical complexity of the iterates $f^n$ of $f$. I will describe how $\delta_f$ also bounds the arithmetic complexity of the $f$-orbit of a point $P \in X(\mathbb{Q})$. More precisely, for every $\varepsilon > 0$ and ample height function $h_X$, we have $h_X(f^n(P)) \leq C f, \varepsilon (\delta_f + \varepsilon)^n h_X(P)$. Applications include an inequality $\alpha_f(P) \leq \delta_f$ for the arithmetic entropy and the construction of a dynamical canonical height for morphisms $f$ satisfying an algebraic equivalence $f^* D \equiv \beta D$ for some $\beta > \sqrt{\delta_f}$. (Joint work with Shu Kawaguchi.) (Received September 21, 2012)