We discuss when two rational functions $f$ and $g$ can have the same measure of maximal entropy. The polynomial case was completed by (Beardon, Levin, Baker-Eremenko, · · · , 1980s-90s), and we address the rational case following Levin-Prytycki (1997). We show: for generic $f$ of degree $d \geq 3$, if $\mu_f = \mu_g$, then $f$ and $g$ share an iterate ($f^n = g^m$ for some $n$ and $m$), under further generic condition, $\mu_f = \mu_g$ implies that $g = f^n$ for some $n \geq 1$. For generic $f \in \text{Rat}_2$, $\mu_f = \mu_g$ implies that for some $n \geq 1$, $g = f^n$ or $\sigma_f \circ f^n$, where $\sigma_f$ permutes two points in each fiber of $f$. And we construct examples of $f$ and $g$ with $\mu_f = \mu_g$ such that $f^n \neq \sigma \circ g^m$ for any $\sigma \in \text{PSL}(2,C)$ and $m, n \geq 1$. (Received August 28, 2012)