Assume, for the moment, that $g(M) \subset M, g(M) \neq M$. Since g is an injection, $g^2(M) \subset g(M), g^2(M) \neq g(M)$. Repeating this argument, we see that $g^{n+1}(M) \subset g^n(M), g^{n+1}(M) \neq g^n(M)$ for all n. Therefore, we have a strictly descending chain

$$M \supset g(M) \supset g^2(M) \supset ...$$

contradicting the fact that M is an artinian module.