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It is shown that a curve on the unit sphere is a non trivial soliton solution to the Curve Shortening Flow if, and only if, its geodesic curvature is proportional to the inner product between its tangent vector and a fixed non zero vector of  $\mathbb{R}^3$ . Using this characterization, we describe the geometry of such a curve on the sphere, we study its qualitative behaviour and we prove the convergence of the curve to the equator orthogonal to the fixed vector.