The Jefferson Lab Eta Factory (JEF) is an experiment that is designed to run in Hall D at Jefferson Lab (JLab) using the upgraded Gluonic eXcitations experiment (GlueX) facility to study the different decay modes of the eta meson (η). The present GlueX setup comprises a ~2 Tesla solenoid magnet, a liquid hydrogen target, drift chambers used for tracking charged particles and an array of lead glass (PbO) blocks (the Forward Calorimeter (FCAL)) downstream of the magnet for detecting neutral particles. For JEF, the PbO crystals are upgraded to Lead Tungstate (PbWO) crystals to improve photon detection efficiency. Measurement of n decay channels are used to determine the lightquark mass ratio via $\eta \rightarrow \pi^+ \pi^- \pi^0$ and allows access to higher-order terms in Chiral Perturbation Theory via $\eta \rightarrow \pi^0 \gamma \gamma$. Additionally, η decays are used to constrain new charge conjugation violating - parity conserving (CVPC) reactions and to search for signatures of dark matter. In particular, $\eta \rightarrow \pi^0 \gamma \gamma$ is used to search for lepto-phobic dark vector (B) bosons in $\eta \rightarrow B\gamma$ (B $\rightarrow \pi^0 \gamma$) or dark scalar (S) bosons in $\eta \rightarrow \pi^0 S$ (S $\rightarrow \gamma \gamma$). Studying the rare radiative decay channel $\eta \rightarrow \pi^0 \gamma \gamma$ required our replacing the 4×4×45 cm³ PbO blocks in the inner region of FCAL with $2 \times 2 \times 20$ cm³ PbWO crystals, which provide about a factor of two improvement in position and energy resolution. We will describe the JEF physics program and the upgrade to FCAL in our presentation.