To prove by induction, we only need to show that the inductive hypothesis $T(n) = n \lg n$ holds true for the base case, and that it holds true recursively.

Base Case: Since n is given to be a power of 2, the base case is when $n = 2$. For this case, we have $T(2) = 2 \lg 2 = 2 \times 1 = 2$

Recursion Equation: We know that for $n > 2$

$$T(n) = 2T(n/2) + n$$

Since n is a power of 2, so is $n/2$. Now, assuming our inductive hypothesis is true for $T(n/2)$, we have

$$T(n) = 2T(n/2) + n$$

$$T(n) = 2(n/2)(\lg(n/2)) + n$$

$$T(n) = n(\lg(n) - 1) + n$$

$$T(n) = n(\lg(n) - n + n$$

$$T(n) = n \lg(n)$$

Thus the proof is complete.