Lemma : p prime $\Rightarrow 3 \mid p+2 \vee 3 \mid p+4$

Proof : Consider the triple $(n, n+1, n+2) \forall n \in \mathbb{N}^*$. Then, necessarily,

$$3 \mid n \vee 3 \mid n+1 \vee 3 \mid n+2.$$

Consequently, if p is prime, then $3 \nmid p$, and

$$3 \mid p+1 \vee 3 \mid p+2,$$

which is equivalent to

$$3 \mid p+4 \vee 3 \mid p+2.$$

□