Nonregular Languages, Part One
Supplement for Preparatory Viewing

Pumping Lemma for Regular Languages: If A is a regular language, then there is a number $p \geq 1$ (called the ***pumping length*** for A) — which only depends on A — such that if s is any string in A with length at least p, then s can be divided into three pieces $s = xyz$ (for $x, y, z \in \Sigma^\star$), satisfying the following three conditions.

1. $xy^iz \in A$ for every integer i such that $i \geq 0$.
2. $|y| > 0$ (so that $y \neq \lambda$).
3. $|xy| \leq p$.