1086-91-1179 **Rachel Esselstein*** (resselstein@csumb.edu), 100 Campus Center Dr, Department of Mathematics and Statistics, Seaside, CA 93955, **Jason Lee** (jleemath@gmail.com), 9800 Savage Road, Ft. Meade, MD 20755, and **Jordan White**, 100 Campus Center, Department of Mathematics and Statistics, Seaside, CA 93955. *Periodicity in 3-element Subtraction Games.* Preliminary report.

The well-known combinatorial game Nim is played with heaps of stones. Two players take turns removing stones from any heap of their choosing. Subtraction games are a generalization of nim where the number of stones a player may remove from the heap is restricted to be a number coming from a pre-specified set $S \subset \mathbb{N}$. We call S the subtraction set for the game. We retain the normal play convention, where the last player able to move wins the game.

Each subtraction set S corresponds to an infinite sequence, called the Grundy sequence, which gives information about winning strategies in any game on S.

It is not hard to show that the Grundy sequence for a subtraction game with a finite subtraction set is ultimately periodic. A more challenging problem is to describe a formula to compute the period of a Grundy sequence given any finite subtraction set S. We will present preliminary results on such methods to determine the periods for sequences on three-element subtraction sets. We will also present evidence in support of a conjecture that the period for three element subtraction sets will always be a multiple of the sum or difference of elements in the subtraction set. (Received September 23, 2012)