1043-20-37 **Luise-Charlotte Kappe** (menger@math.binghamton.edu), Department of Mathematical Sciences, SUNY at Binghamton, Binghamton, NY 13902-6000, and **Gabriela Mendoza*** (Gabriela.Mendoza@rcc.edu), Department of Mathematics, Riverside Community College, Riverside, CA 92506. *Groups of minimal order such that for given n the n-th powers of elements do not form a subgroup.* Preliminary report.

It is well known that the squares of elements in a group do not form a subgroup and that the alternating group on four letters is minimal with this property. For given n, what is the group of minimal order such that the n-th powers of elements do not form a subgroup? For odd n, it can be shown that the dihedral group of order $2p$ is minimal with this property, where p is the smallest prime dividing n.

If n is even, the situation is more complex. The order of the group of minimal order with this property depends on the odd prime factors of n and the exact 2-power dividing n. With initial guidance from GAP, we determine the groups of minimal order such that the n-th powers do not form a subgroup in case $n = 2k$, $4k$, and $8k$, where k is odd. (Received July 28, 2008)