Class Prep (prepare for Wednesday, January 31)

Finish making the 90 PHiZZ units (just kidding on the 60: it's 60 vertices, but 90 edges) your group will need to make a soccer ball. Note that the PHiZZ units that are already made and in the box **are available** for this construction—that's what we were making them for. Feel free to adjust your color scheme based on this fact; sorry if that wasn't clear before!

A bit of reading:

Definition 1. *The* order *of a group G is the number of elements in G and is denoted by $|G|$. The* order *of an element g in a group G is the smallest positive integer n such that doing the binary operation with n g's gives you back the identity element of the group (so if your binary operation is multiplication, this means that g^n is the identity; if your binary operation is addition, this means that ng is the identity). If no such integer exists, then we say that the order of g is infinite. We denote the order of an element by $|g|$.*

Recall that, as we discussed in class, a subset H of a group G that is itself a group (satisfies the definition of group) is a *subgroup* of G.

Definition 2. *A group in which the binary operation is commutative ($a * b = b * a$ for all a, b in the group) is called an* abelian *group.*

Problems (due Friday, February 2 at the beginning of class)

1. Consider the subset of $(\mathbb{Z}_{10}, +)$ generated by 2. Is this subset a subgroup of $(\mathbb{Z}_{10}, +)$? You can assume that associativity of addition holds in the subset as well as in the parent group.
2. Suppose G is an abelian group with identity e. Show that $\{g \in G \colon g^2 = e\}$ is a subgroup of G.