Incorporation of the GEMs item: **Solventless reactions: the aldol reaction** submitted by James E. Hutchison into a High School/Outreach curriculum.

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**Summary:** This five-minute solvent-free, atom economic reaction demonstrates a number of green chemical principles. This organic chemical synthesis can come out of the classroom and into outreach audiences with ease. The experiment starts with the mixing of two solids that liquefy, demonstrating the physical property of melting point depression. The addition of catalytic NaOH effects the visible formation into a product, as the clear liquid transforms into a yellow solid.

In outreach mode this method can be used to discuss the interest that chemists have in transforming one substance into another. Further, chemists are interested in designing specific physical properties into molecules. When performing the experiment as an outreach, it is often useful to pre-weigh the materials to reduce time and log jams at balance stations.

The outreach lesson can be substantially more dramatic if this procedure is compared to a solvent-based aldol synthesis (perhaps performing the same reaction in ethanol solvent as a demonstration). The products could then be shown to be the same and the Twelve Principles of Green Chemistry could be consulted for comparison. The experiment especially invites discussion of atom economy, use of catalysis (the NaOH), solvent reduction, and the generation of waste. If a solvent-based procedure is also performed, one might introduce the topic of E-factor and green metrics as a way of quantifying the green-ness of the two procedures.