**Instructional Unit Title: Chemical Reactions**

The teacher may provide concrete interactive experiences (e.g., labs, card sort, demonstrations) so students can explore the differences between chemical and physical changes.

The teacher may engage the students in using models (e.g., 3-D, digital, particulate diagram, ball and stick) to explain conservation of mass so students can begin discerning relationships between reactants and products.

The teacher may provide a variety of opportunities (e.g., reaction demonstrations, word equations, discussions) so students can begin to recognize the significance of using correct symbols (naming and subscripts) in relation to writing and balancing chemical equations representing reactions.

The teacher may present examples (e.g., variable equations, analogies) demonstrating patterns that chemical reactions follow so students can use the patterns to classify chemical reactions.

The teacher may lead activities that apply stoichiometry so students can understand the quantities of reactant and products necessary to achieve a balanced chemical equation.

The teacher may introduce the topic of mole ratios so students can begin to recognize that the determination of mole ratios can only be made once a chemical equation is balanced.

The teacher may provide simulations around single replacement, double replacement, synthesis, decomposition, and combustion so students can predict products from patterns and write balanced chemical equations.

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The teacher may model demonstrations of reaction types so students can experience, observe, and begin to analyze chemical reactions.

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**PERFORMANCE ASSESSMENT:** A local battery company found using the product from the reaction of zinc metal and HCl increases battery life by 50%. The company has hired you to conduct an experiment to determine the (a) reaction type, (b) identity of the useful product, and (c) how much zinc is required to make the 4.83 g of product needed per battery.

Other information: There are two products in the reaction. One is not useful and will bubble away during the reaction.

Your task: Generate a report for the company in which you answer the three (a-c) requirements given in the introduction. Your report must include the products of this reaction, a balanced equation, the type of reaction, and the use of stoichiometry to determine the amount of product necessary for one battery.

This unit was authored by a team of Colorado educators. The unit is intended to support teachers, schools, and districts as they make their own local decisions around the best instructional plans and practices for all students. To see the entire instructional unit sample with possible learning experiences, resources, differentiation, and assessments visit [http://www.cde.state.co.us/standardsandinstruction/instructionalunitsamples](http://www.cde.state.co.us/standardsandinstruction/instructionalunitsamples).