Factors Affecting Reaction Rates

Summary
Student will investigate variables that have an effect on the rate of a reaction. They will design part of the experiment themselves.

Main Core Tie
Science - Chemistry
Standard 5 Objective 1

Time Frame
2 class periods of 90 minutes each

Group Size
Pairs

Materials
- student instructions/worksheet
  (attached)
- acidified* 0.4 M NaC2O4 (sodium oxalate)
- acidified 0.1 M FeSO4
- 0.02 M KMnO4
- 0.01 M MnCl2
- set of 6 small test tubes
- distilled water
- stopwatch
- heat source
  * acidified means that the solution contains also 1 M H2SO4 (aq). The reaction won’t occur unless there are some H+ ions around.

Background for Teachers
Time Needed:
Day 1, 89 min. Day 2, 50 minutes.

Safety considerations:
Lab glasses, standard chemical safety handling

Instructional Procedures
Prepare solutions and gather other lab materials.
Go over procedures for Day 1 with student and allow them to complete the experiments.
Summarize the results with students and make sure they understood the procedures and were able to consistently gather results.
Allow time to plan the Day 2 experiment. Provide students with the scoring guide below to help them design the research. Encourage students to work creatively and not duplicate other groups work. If you are finding that students are missing an important variable (heating or concentration) encourage groups that are struggling for an idea to use them.
Check student design for safety and scientific thought before allowing students to perform the experiment.
Allow time on Day 2 for students to perform their experiment and report their results to the class. Use the scoring guide to grade student work as they report on their experiment.

Assessment Plan
Use the scoring guide attached.

Bibliography
Lesson Design by Jordan School District Teachers and Staff. Adapted from: http://www.hwscience.com/smarsden/

Authors
Utah LessonPlans