ENGAGE:

Demonstrating the Mentos and Coke will engage the students but only temporarily. For this lesson, we needed to make the kids take ownership over the experiments that we were going to ask them to do. So, we presented a brief lesson on reaction rates then told them that we were going to write up our results and give them to the government, who needed scientific data on this phenomenon that was sweeping the nation. This really engaged the students and they remained that way throughout the 10 day lesson.

Prior to the introduction of this lesson, we demonstrated the traditional experiments used to teach factors that increase reaction rates:

- Surface area (Alka-Seltzer tablets whole and crushed and placed into water)
- Concentration (beach ball thrown into the whole class, beach ball thrown into ¼ of the class)
- Temperature (Alka-Seltzer tablets in cold water, RT water, and boiling water)
- Catalyst (real world example)

EXPLORE I:

The students were put into groups of three. The groups were then given ample time to:

- Form the hypothesis that they would test
- Write out and turn in their materials list
- Plan their experimental design
  - They had to identify all variables in their experiment and include a control as well as write out their experiment in easy to follow instructions
- Finally have a written plan for data collection and analysis
  ** “Official” government sheets were handed out that asked for their official hypothesis, requested materials, and a summary of their experimental design.
  ** Each group required approval via signature before moving on to each progressive step
  ** The main objective and requirement was for the groups to form a hypothesis that tested one of the four factors that increase a reaction.

EXPLORE II:

TESTING DAY!!

One at a time, each group brought their materials to the testing table, announced their hypothesis, and then proceeded to test their hypothesis in front of the rest of the class.

Examples of hypotheses:

- Hot soda will produce a higher geyser than room temp or cold soda. (testing Temperature)
- Crushed Mentos will produce a higher geyser than whole Mentos. (testing Surface Area)

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- Mentos candies will produce a higher geyser than Skittles or Pop rocks. (testing Catalyst)
- Soda with more carbonation will produce the highest geyser. (testing Concentration)

**EXPLAIN:**

After each group tested their hypothesis and gathered their data, they were asked to analyze their data and organize it into a PowerPoint presentation that they then presented to the class.

**The students were provided a template to create their presentations.**

**EVALUATE:**

Each group was evaluated based on:

- Completion of the handouts
- Content, organization, and presentation of their PowerPoint

Each student was evaluated based on:

- Their participation and contribution to their group
- Their individual lab reports

**REFLECT:**

This year we are focusing on bringing inquiry into the classroom. Inquiry is different from your traditional teaching style in that it is student driven. The students are the ones that ask the questions and determine how to answer those questions.

- Introduce them to inquiry slowly (guided inquiry) to prime them to be successful when more open inquiry is asked of them.

For this lesson, the students were asked to form their own hypotheses and their own experimental design.

- Give the students ample time to formulate their hypotheses and experimental designs
- To keep the students focused on the experiment, have them work on their lab reports if they finish before other groups

Having everyone write their own lab report, separate from their lab groups, allowed us to assess their understanding of the experiment and the basic ideas behind the lesson on an individual basis.

For a more complete lesson of *3…2…1…Lift off* and other GK-12 lesson plans please visit [www.purdue.edu/dp/gk12](http://www.purdue.edu/dp/gk12)