Action and Reaction
Class size: Up to 32 students
Time: 45 minutes

Introduction: This lab is meant to be a fun and engaging activity about chemical actions and reactions. It is intended to foster higher order thought the sciences and foster efficacy in the sciences. This lesson is presented in between classroom topics the day before Thanksgiving vacation were attendance was anticiapted to be low and the mind set of students understandably unfocused.

Materials:
Alka-seltzer tablets
35 mm film cannisters
Potassium Iodide - reagent grade
Hydrogen Peroxide - 30% reagent grade (safety precautions need to be addressed)
golf balls
paper towel tubes
buckets
cardboard pieces to fit over bucket tops like an unsecured lid water
liquid soap
Graduated Cylinder
Paper Towels!

Due to the volatility of H2O2 - the elephant toothpaste should be done as a demonstration by an individual who is familiar with the material and knows the safety standards and precautions. Rocket Launch pads need to be constructed prior to class. Simply glue a toilet paper roll or other pipe/tube like material to plastic or cardboard base. The 35 mm cannister rocket should be placed upside down in the tube for launching

Demonstration: Elephant tooth paste
Place a graduated cylinder in a deep sink or plastic basin. Add a small amount (squirt) of liquid soap and 8-10ml of H2O2.

At this point we are ready to and the potassium iodide which is the main a=catalyst of the reaction - precaution should be taken as this is an eothermic reaction. Do not touch the cylinder or the foam as the reaction is happening burns made result. Add a 1/4 of a tsp of potassium iodide and quickly step back.

The reaction of potassium the the H2O2 will release oxygen very quickly causing the liquid soap to form a mass amount of foam very rapidly.
Elephant toothpaste!
Discuss reactions as a group. And have students work in small groups 2-3 on the physics activity below.

Activity 2: Equal and opposite reactions
Fill your buckets or bins 3/4 with water.

Place a carboard lid (over hang is needed) over the top of the bucket. Balance the paper towel tube on top followed by the golf ball.

The goal of this activity is to get the ball into the water without pulling the cardboard lid or touching the golf ball. If the student pushed the cardboard lid in a quick and swift motion away from themselves - and others - and the force is balanced the tube should fall over dropping the golf ball neatly into the water filled bucket.
If the force is not equal the ball will go where ever it will and not go into the bucket.

After 5-7 minutes discuss with the class what the idea of equal and opposite reactions are. Have students discuss whether or not the first demonstration was equal and opposite.

Activity 3: Alka-seltzer Rockets
Have students set up their own rockets and allow them to set them off. They should discuss with each other if this is equal and opposite.

Homework:

Urban Ecology Group blog on ecology issues they have learned about. I.E. An oil company spilled oil into Newtown Creek nearly 30 years ago (action) and nothing has been sincerely done to remediate this issue - has the community and politicans reacted equally to the oil companies actions. What should be done? Students discovered that there was a major source of air pollution in their neighborhood (action), the neighborhood has little parks and trees to help diffuse emissions from manufacturers and cars, what would be an appropriate reaction now that we know that there is a problem?