Rock-it Science Observations For Winter Lessons 2010

Steam Engines (Resonant Steam Boat Testing and Racing)

Students were given copper tubing that had a small coil shape bent into the middle. Some had ½ turn. Some had 1 ½ turns. Some had 2 ½ turns. Some had 3 ½ turns, And Some had 4 ½ turns. They filled it with water, put both ends under water and heated the coils with a torch to see what would happen.

They may have noticed:

- The tubing did nothing for awhile.
- The first sign of action was when the tubing jumped.
- Each time the tubing pulsed, water squirted out of both ends.
- The water squirting out didn't feel hot.
- If the torch was too hot, the pulsing stopped.
- If the torch wasn't hot enough, the pulsing stopped.
- When the heat was just right, the tubing would pulse rhythmically.
- When the torch was too hot, the tubing would change colors: blue, gold, and purple.
- When the torch was removed, sometimes the tubing would start pulsing again.
- Air bubbles in the tubing stopped it from working.
- The ones with more turns worked better.
- The one with ½ turn hardly worked at all.

When glued into a boat, the tubing could propel the boat:

- The water squirting out knocked the bubbles off of the bottom of the pool.
- The boats with more turns generally worked better.
- The one with 4 ½ turns was heavier and took longer to get going.
- The torch flame itself can make the boat move a little.
- Coat sleeves are flammable.