Partial List of Talmud/Physical-Science Lab Topics

1. Jewish Torah ink: With the help of science teacher Ms. Bonfim, students used an ancient ink recipe that is discussed by Tosafot, using tree galls (tannic acid), tree gum, ferrous sulfate (Fe2SO43), and a liquid base. As our ancestors did, the students mixed the ingredients and produced ink which they then used to write with. It was an important opportunity to consider the reason why all the various ingredients matter, and why the resulting product wasn't complete if one or the other was missing, and also to look at the scientific/chemical side of a Jewish legal topic.

2. Salt is like cooking: In mid-winter, students bring snowmelt salt to the school parking lot together with Mr. Alge, and experiment with the effects salts have on frozen mixtures to consider the physical and chemical effects of salts, and why Jewish Law occasionally considers the salting of a substance as being analogous to cooking (such as in the laws of Kashrut).

3. Can I use my microwave on Shabbat? As a lab component of the study of the laws of cooking on Shabbat (Talmud 39a, Shulchan Aruch 318), students cook foods using convection, conduction, and radiation heat transfers, (building solar ovens to illustrate radiation cooking), and consider why Jewish Law treats different types of heat transfers differently. As a lesson extension, some students may research what the status of microwave cooking should be on Shabbat according to Jewish Law.

4. What is the temperature for the hand recoiling? With the help of science teacher Dr, Fischer, Students heat cups of water to various temperatures, in an effort to consider the controversy over determining the temperature at which the hand recoils and the way in which the Shabbat rules around cooking and heating relate to the boiling of water and the heating of water. Students also use statistical methods to consider the average and outlier cases for this temperature. Students also evaluate the difference between water warmed in a first cup or a second cup.

5. Does the water mix in a two pool top/bottom Mikvah? Students recreate the famous experiment with colored water of different temperatures to consider whether warm water sinks or rises, in order to understand the controversy over Mikvaot with an upper and lower level pools, and whether they allay Rabad's concerns about "a quart was removed and a new quart entered" and the intermingling of discrete water molecules in a large collection.

6. Do any insulators increase heat? Students may find difficulty with the Talmudic distinction between insulators that increase heat and insulators that retain heat, as this seems to violate the first law of thermodynamics. Students experiment with the various types of insulators that appear in the Talmud to consider the category.