**Jello Jiggliness**

**Purpose:** To determine the storage modulus for Jello.

**Background:** This lab is based on a piece of equipment called a rheometer. Rheology is used in many types of engineering, materials science, and even food science. Understanding the firmness of materials and how they behave under applied stresses and strains is integral in the design process. The rheometer used here can be constructed out of much more affordable and transportable materials (many of which you have in your classroom already). Although the materials and the design outlined below are what we used, I suspect you could build an even less expensive version out of a ring stand with a smooth base.

**Preparing the Samples:**

1. Begin by preparing your Jello sample according to the directions for making Jello Jigglers. It is best to prepare them in a large shallow dish. It’s important that the samples are level on top and this will reduce the likelihood of a sample being un-level because of the container’s meniscus. I also recommend refrigerating the Jello uncovered.
2. As for cutting out your samples you want them to be as symmetrical as possible. They can be smaller than your rotating plate but should not be larger than it. We cut our samples with cork borers with can be purchased online for ~$15 but a small cookie cutter would work as well.

**Making Measurements**

1. It may seem like a strange decision to measure in meters considering the scale of your sample however this will allow your final units to be in kPa which is standard for this type of work.
2. When sandwiching the samples it is important that they make complete contact with the rotating plate and the glass beneath them however over squishing can result in skewed results. In a high tech Rheometer the normal force experienced by the rotating plate would be around 0.1 N. Since we have no process for easily measuring FN here, students should simply aim for the minimum amount of possible contact.
3. Calculating the moment of inertia for the disk can be as complicated or as easy as you like. I chose to ignore the mass of the small black plastic piece as it is <5% of the total mass of the system. For the other pieces I also found it advantageous to have the masses already measured. This eliminated the need for taking apart the apparatus and risk losing something. If performing this lab with a less advanced class you could also simply eliminate this step and give them a value for the moment of inertia.
4. This lab has been written for use with Jello Jigglers. I tried using the regular recipe for Jello and found it to be a bit too soft. Other materials I’ve tried with success are tofu (firm)…and SYLGARD 527 Dielectric Gel mixed in a 1:1 or 1:2 ratio. (The 1:1 ratio is very sticky and will be more difficult to cut into a circle). Thoughts for extending this lab would be to compare different flavors of Jello to see if they have different stiffnesses. You could also compare different brands to see if generic has the same stiffness as the name brand.