

# Glow In The Dark Jell-O and Other Science Projects

by Lynne Belluscio

This past weekend, the Jell-O Museum had an exhibit at the Rochester Museum and Science Center. Luckily we had some very dedicated volunteers who helped – Cheryl Fernaays, Shelia Furr, Jacob and Evan Williams, and Joanne Graham. Their job was to explain how the gelometer worked. How to capture bubbles in Jell-O. And why Jell-O has brain waves.

But what seemed to capture everyone's attention was the glow-in-the-dark Jell-O. It's made with a cup of boiling water and a cup of tonic water. First you dissolve the Jell-O in the cup of boiling water and then you add a cup of cold tonic water and stir. Put the Jell-O in the refrigerator until it sets. You'll need a black light to make the Jell-O glow, but no matter which flavor you use, the Jell-O will glow bright blue. The bottle of tonic will glow too.

For the exhibit, I put the dish of Jell-O in a shoebox with a small battery operated black light. I suspect there are a lot of kids eating glow-in-the-dark Jell-O tonight. You can also make glow-in-the-dark Jell-O Jigglers. Again, substituting half the water for tonic water. The magic ingredient is the quinine. The glow-in-the-dark Jell-O is edible, but it does have a little bit of a bitter taste because of the quinine.

The quinine molecules absorb the ultra-violet light emitted by the black light, but almost instantaneously re-emit the light. Some energy gets lost in the process, so the emitted light has a longer wavelength than the absorbed radiation, which makes this light visible and causes the material to appear to 'glow'.

Quinine has an interesting story. It was derived from the bark of a tree found in Peru. A Jesuit priest discovered the medicinal properties of quinine and brought it back to Rome. The tree was often called the Jesuit Tree and Peru exported



quinine for a long time. It was used to cure malaria. Peru forbid the exportation of seeds or plants, but businessmen from the Netherlands were able to smuggle seeds out of Peru and established huge plantations in Java.

By 1930, nearly 97% of the world's quinine came from Java and was controlled by the Dutch. During World War II, the Japanese captured the plantations in Java, and the Germans captured the quinine supplies in the Netherlands. Attempts were made to create synthetic quinine but it wasn't until 1944 that it became available, but it was too late to save the lives of tens of thousands of Allied soldiers.

Another edible experiment that can be done with Jell-O is an experiment with sinkers and floaters. Kids can predict which fruits or vegetables sink or float in Jell-O. You make a batch of Jell-O and throw in the fruit and see what happens. You can also try cutting the fruit up to see if the size makes any difference. (At what point does the apple sink?) And of course, you can eat the experiment when you have recorded your results.

There are some fruits that won't work. Fresh pineapple, kiwi, papaya, guava, and fresh ginger have an enzyme that interacts with the protein molecules in the gelatin and prevents the Jell-O from setting. Canned pineapple is OK, because during the canning process, the pineapple is heated above 150 degrees and the enzymes are destroyed.

There are several other experiments that can be done with Jell-O, such as seeing how much water can be added to the Jell-O before it won't set. In fact, the Jell-O Company at one time had a flavored drink – like Kool Aide – that didn't have any gelatin in it. It was called Zowie and as far as anyone knows, no one has ever seen a package of Zowie.