

**Team Photo # 2**  
**“Hunter, Gatherer”**



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**Special Credit for name: Kenny Wine**

## **Introduction**

Going into the Team Photo #2, our team honestly did not have a clear vision of what we wanted to create or what phenomenon we wanted to see. Everyone in our group has a different picture for this project, and it is because we tried several different experiments. We ended up using a hot plate to melt a high temperature machine wax, and ended up experimenting with different setups for that. For the image that I ended up turning in, we used the wax that had been melted and Acetone in a disposable foil dish.

## **Physics**

The melting temperature of machine wax is approximately 240° F, so we heated the wax up to above this temperature and poured it into a disposable foil dish, approximately 0.5 oz of wax. We allowed the wax to cool down below this temperature for about five minutes because the boiling point of Acetone is around 134° F. We then took Acetone once the wax had cooled slightly and poured approximately the same 0.5 oz quantity into the dish. We allowed for about ten minutes of setting time in order to allow the wax/Acetone compound to solidify slightly.

In doing so, we were able to slow the burn rate of the Acetone down. Acetone normally burns at a very high rate, and by diluting it in the wax we were able to slow down this burn rate. From this combination the flames were calmer and more laminar than the usual quick-burning, turbulent flames of an Acetone burn. We had a venting arm that is normally used in manufacturing shops to help suck up toxic fumes or smoke above this apparatus. From this venting arm the air flow was directed upwards as opposed to having the air being stagnant. This upwards airflow also helped create random vortices. Although these are not present in the photo here, many of the other photos showed incredibly interesting shapes from the slow turning upwards airflow like in Figure 1.



Figure 1-Twisting Flow

The wax/Acetone compound burned for about five plus minutes, whereas a normal Acetone burn is anywhere from thirty seconds to a minute. Essentially we made a

candle with no wick, and the end result of a slow-burning calm flame created a very cool image.

### **Visualization Technique**

As said before a 50/50 mixture of melted machine wax and Acetone was used in order to create the fuel for the flame captured. When taking the photo, we actually were in the dark capturing these images. I will go into further photographic detail in the next section, but the setup for this experiment was very simple. The 50/50 compound was placed in a disposable foil dish, allowed to cool not until the compound was completely solid though, and then we took a lighter and lit the compound. By placing the venting arm over the flame the air flow around the flame was directed upwards, with random air flows being created from this as well.

### **Photographic Technique**

The field of view in this image is approximately six inches wide by maybe eight to ten inches high. The flame is approximately eighteen inches to two feet away from the lens. I used a digital camera, the Olympus PEN E-PL5, with an Olympus 14-42 mm, 1:3,5-5,6 and 37 mm diameter lens. The focal length of this photo is 21 mm. The Exposure aspects of the image are a f/6.3 aperture, 1/800 second shutter speed, and an ISO speed of 200. The image 3,095 pixels wide X 3,402 pixels tall. As far as post-processing, no editing besides a simple cropping of the image was done. I only cropped out the foil dish at the bottom of the image, because I really like the image as it was.

### **Image Results**

Overall I am very pleased with the photo. Going into this project with such uncertainty was a little nerve-wracking, but through experimentation and trying several different concepts I'm happy on the phenomenon I happened upon. I love flames, and the way that this wax/Acetone compound burned was awesome. From a photography perspective this allowed a great amount of time to take an image, once the right settings were dialed in. If I were to do this over I would create a montage of photos, I actually captured enough images that looked like a plethora of different things. I captured a lot of images that looked like animals so if I were to resubmit an image I would submit a "Fire Zoo". In general though I am happy with the result and would love to keep pursuing the setup in order to keep capturing cool images.