



**CALIFORNIA STATE SCIENCE FAIR  
2017 PROJECT SUMMARY**

<b>Name(s)</b> <b>Jacob J. Bright</b>	<b>Project Number</b> <b>J1404</b>
<b>Project Title</b> <b>Bringing the Heat: Testing Synthetic Plastics to Determine Melting Point and Heat Resistance</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The goal of my science project was to determine which of six different plastics (polyester, polycarbonate, polypropylene, polyethylene, polystyrene, and ABS) took the longest period of time to show signs of melting when subjected to extreme heat. My hypothesis was that polyester would take the longest amount of time to melt because it has the highest predicted melting point of the six (about 482-500°). I used a butane torch to melt the plastics. The potential applications of my project include any real-world scenario where plastics are subjected to extreme heat. For example, recently there have been incidents where cell phones overheated and either burst into flames or exploded. My project could help determine better materials for cell phone casings that could minimize damage.</p> <p><b>Methods/Materials</b> I tested each of the 6 plastics 6 times using a 4#x1#x1/8# plastic strip each time. I placed each strip onto two piles of washers situated on top of a platform. I secured the butane torch into a consistent place using a vise and kept it aimed there for the entire course of the experiment. I identified when the plastic had melted using two brass weights placed near the center of the strip. I aimed the flame at the center of the strip, and when the weights drooped or the strip collapsed, I defined the plastic as having been melted. I timed the melting process with two stopwatches to ensure accuracy.</p> <p><b>Results</b> Once I had tested all 36 samples, I took the results of the experiment and formed averages based on the accumulated times of each plastic. They were (from lowest to highest) polystyrene (average time of 15.57 seconds), polyethylene (21.22s), ABS (21.94s), polypropylene (23.31s), polycarbonate (26.35s), polyester (37.36s). I was able to melt all 36 samples and from that data, I came to a conclusion about which plastic melted most slowly.</p> <p><b>Conclusions/Discussion</b> The data supported my hypothesis that polyester would be the plastic that melted at the slowest rate (about 37.36 s). These results can help to expand our knowledge about this subject. Using this data, scientists could design better protective casings for phones that can withstand greater amounts of heat in the event of a battery failure or similar condition. Based on my project, polyester would be the best casing material. This data would also be relevant to any other situation where a plastic with good heat resistance is required.</p>	
<b>Summary Statement</b> My project is about determining which of six different types of plastics takes the most amount of time to melt when subjected to extreme heat and applying the results to real-world situations where materials must undergo these conditions.	
<b>Help Received</b> My grandfather assisted by helping me cut the plastics into consistent sizes. My father and grandfather helped me perform the experiment.	