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18.0.E Posters Research Conference Consumer Product Assessment

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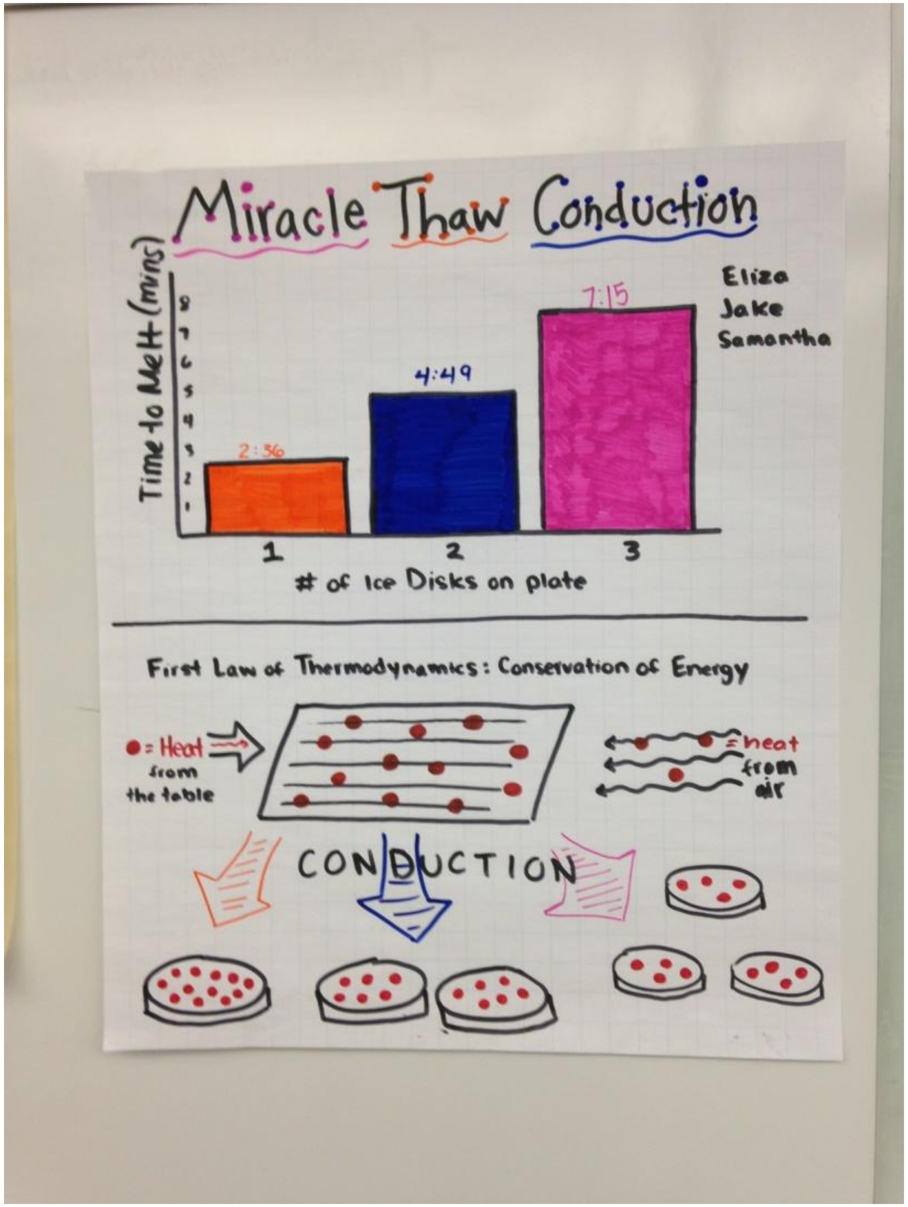

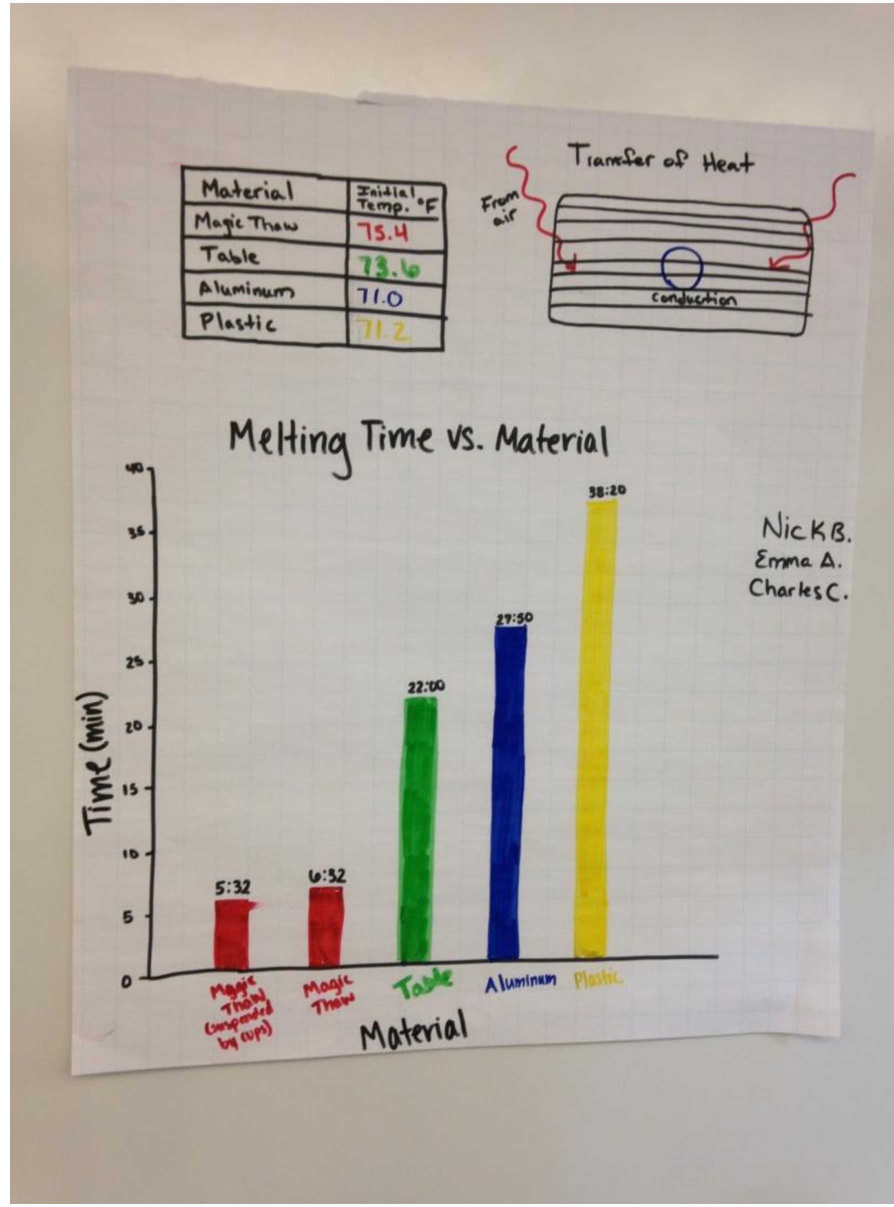

Christopher F. Bauer, Principal Investigator.
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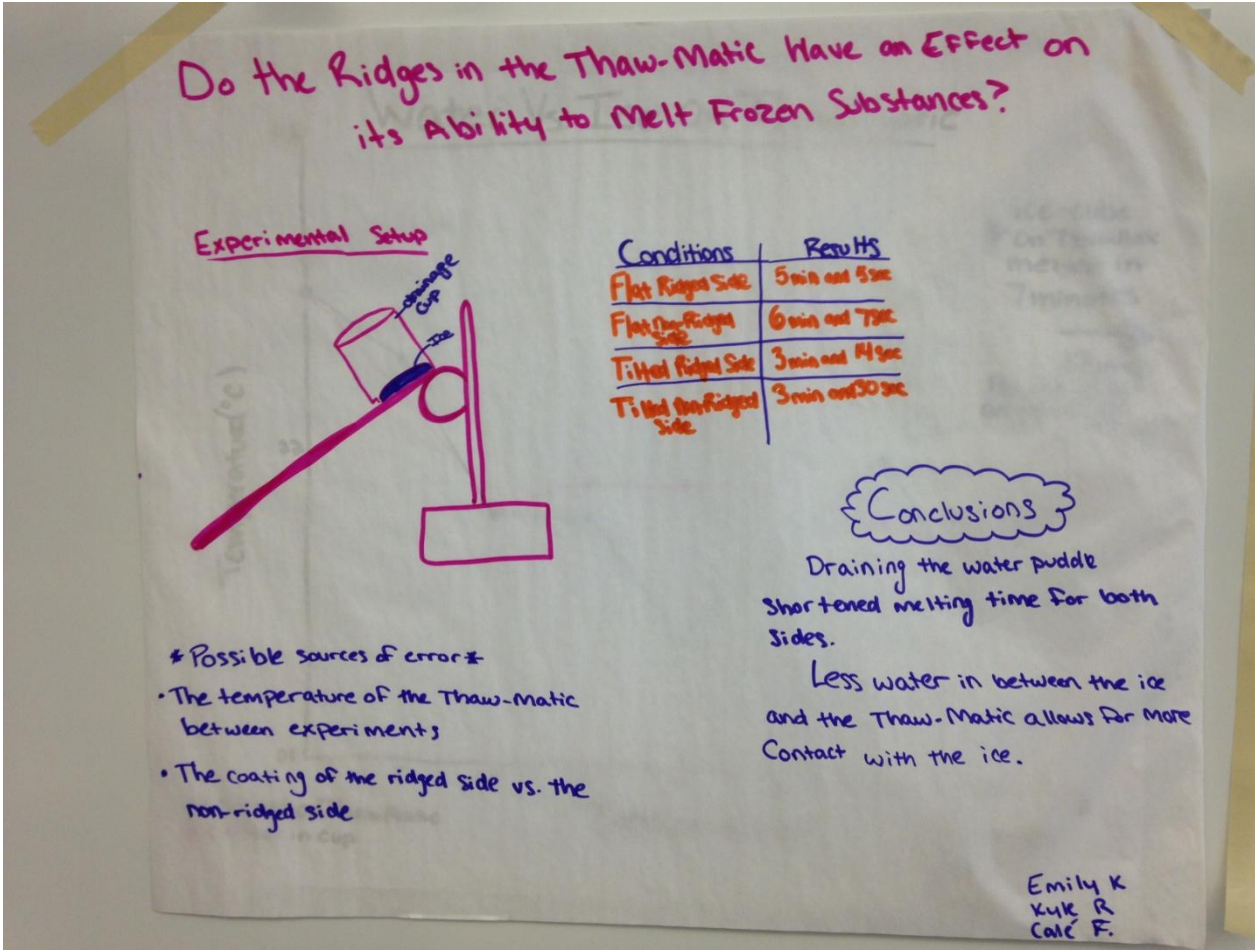

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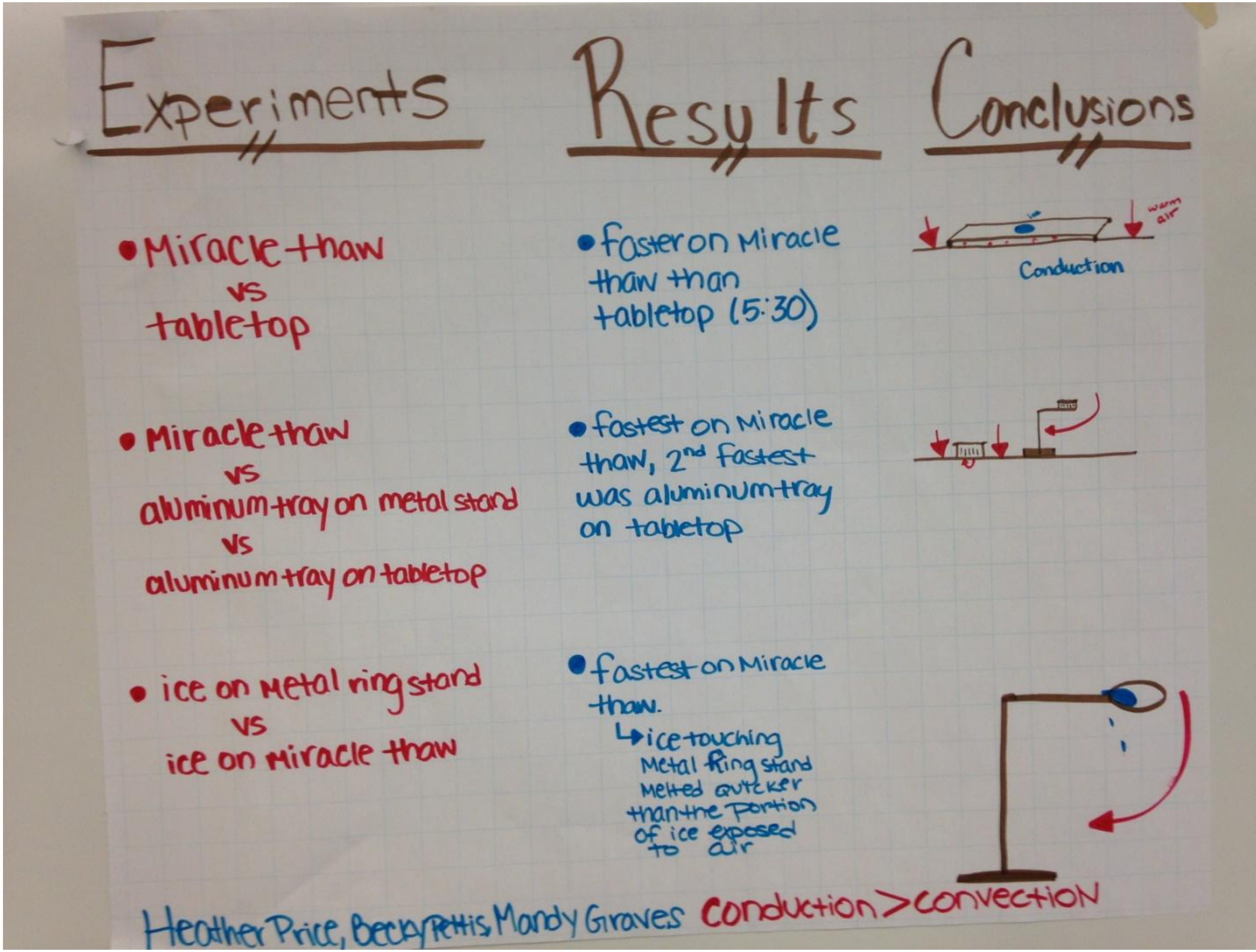

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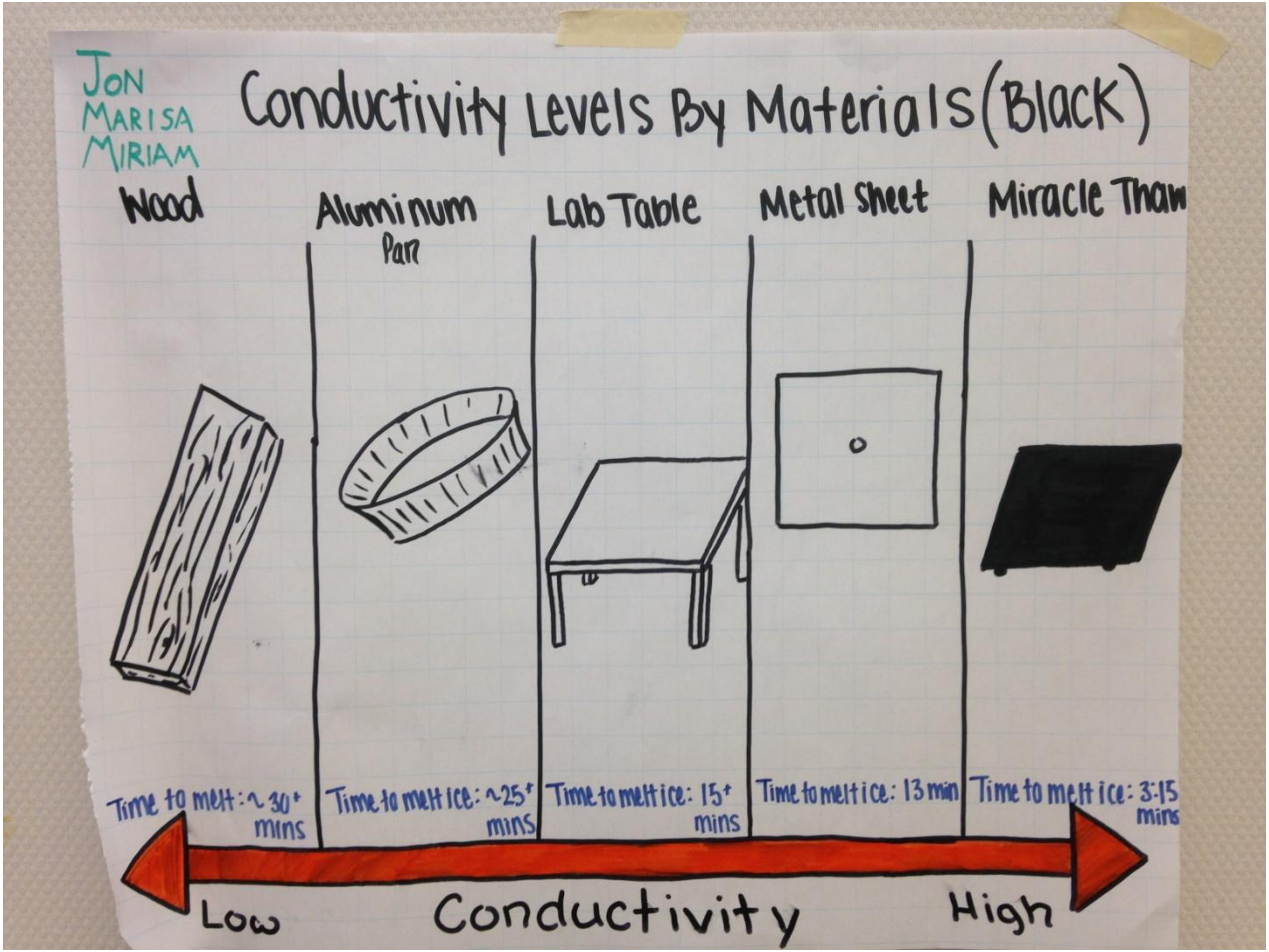

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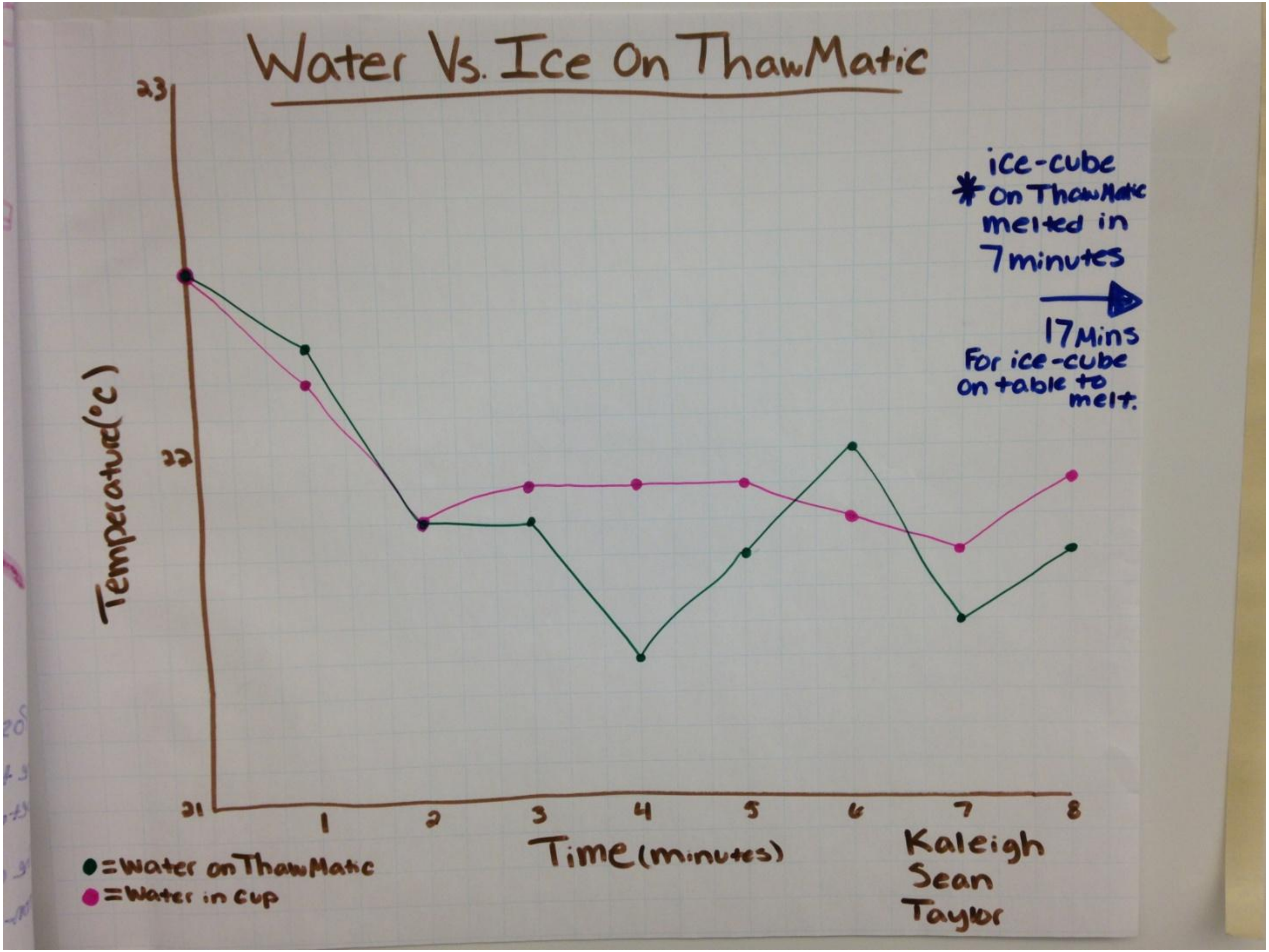

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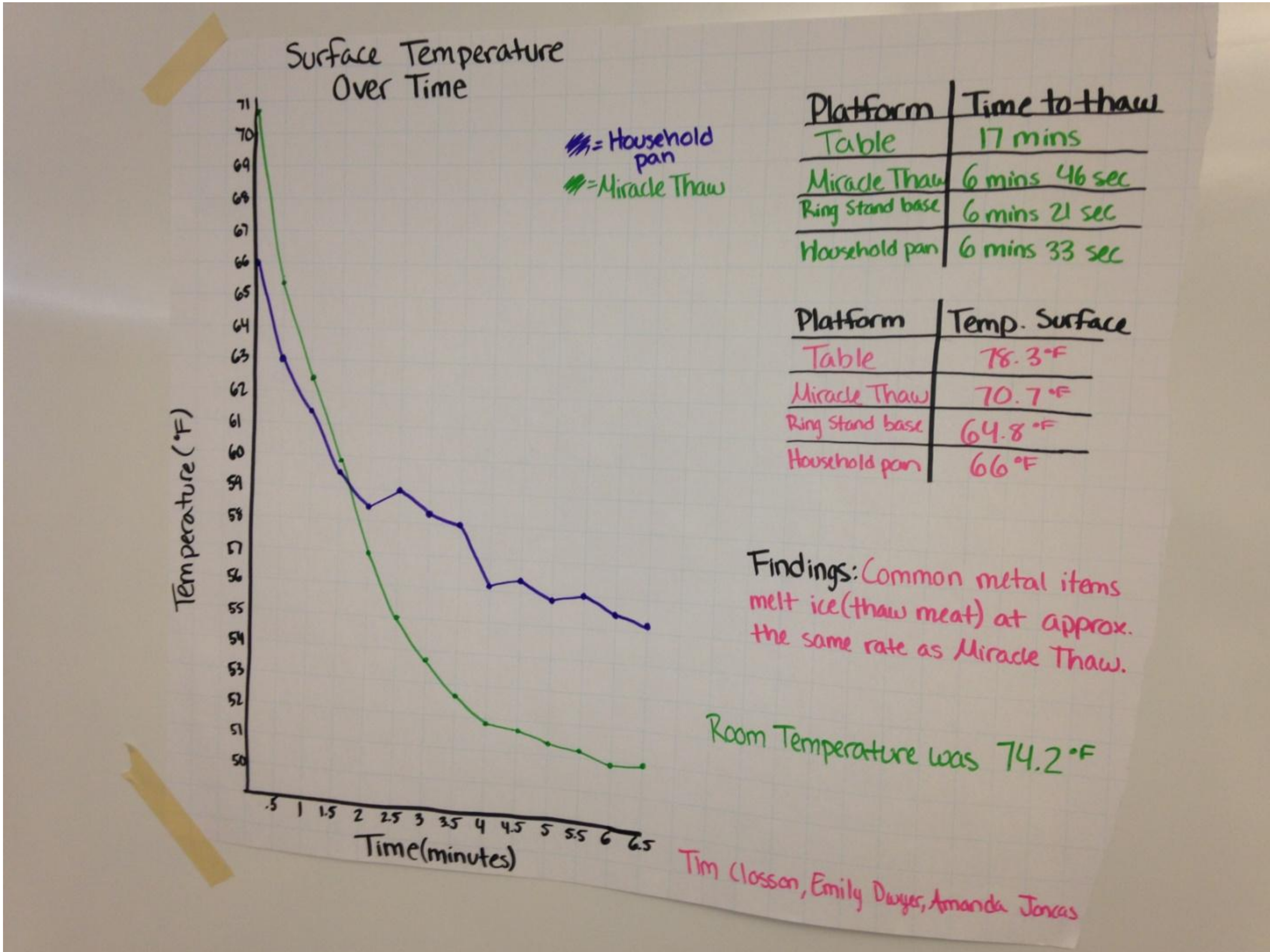

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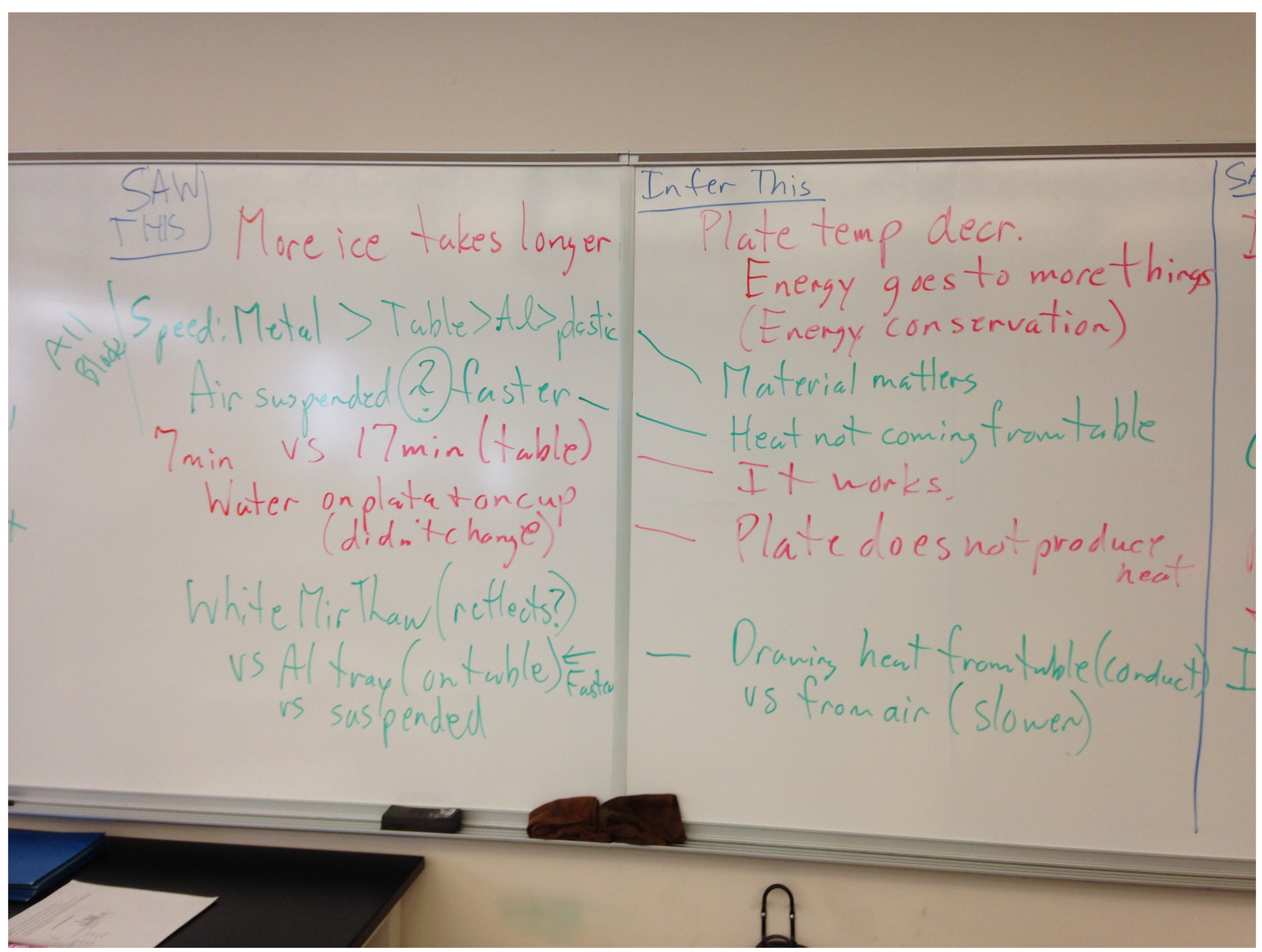

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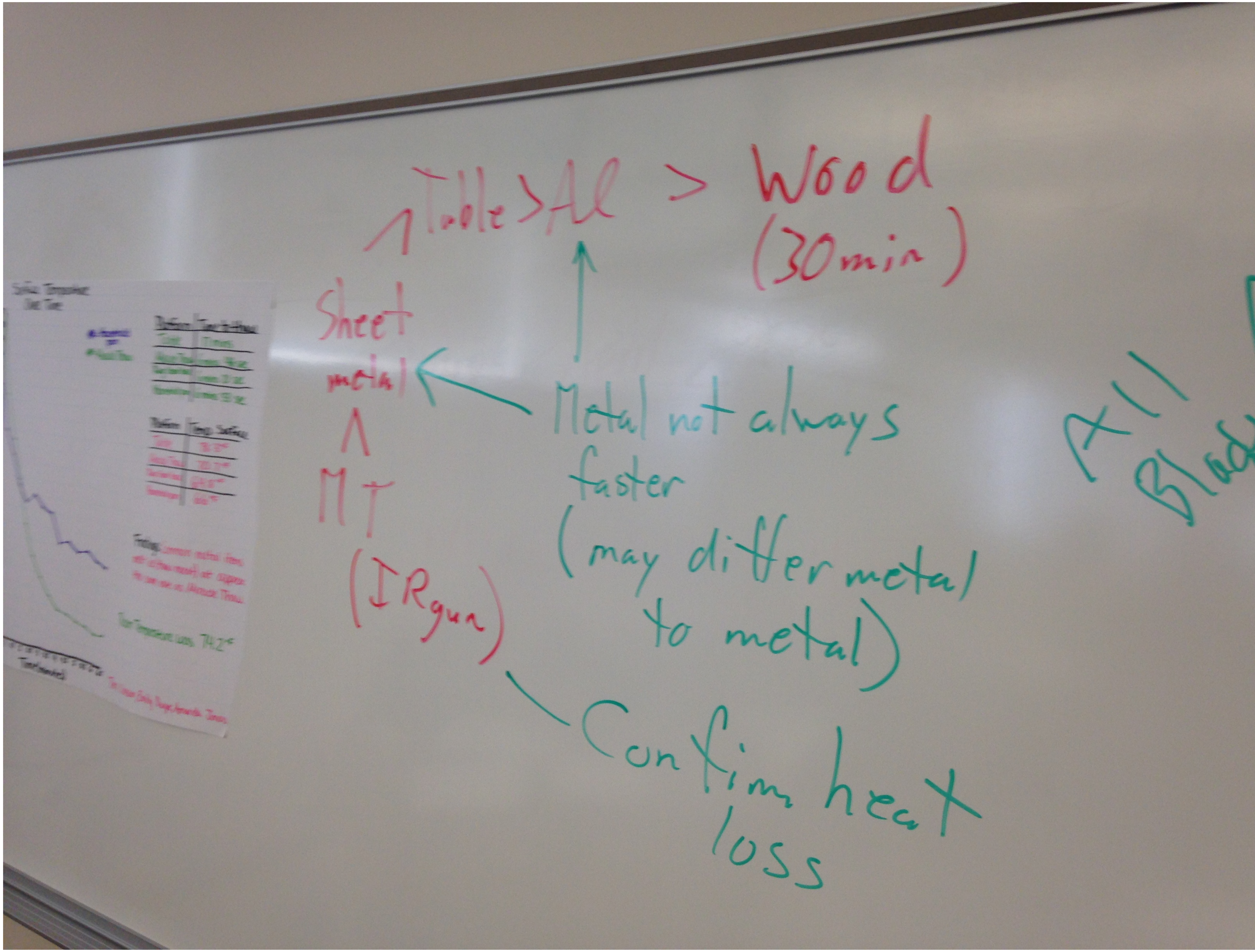

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Research Conference Findings – Performance of MagicThaw and Thawmatic Consumer products

Collection of observations and inferences about how the products work

It is possible that I have reworded or rephrased these for clarity vs original notes

The product is call MT below for shorthand

A couple of notes in red bring your attention to some aspects we did not test.

Observation (what we saw)	Inference (what we think it means)
In all experiment, air was in contact with the ice and any underlying material. Melting always occurs where the ice contacted the underlying material.	Air contact alone does not transfer heat to any great extent. [What could we have done experimentally to test this directly?]
Several independent groups found that ice on MT melted in 5-7 minutes, faster than many other materials	MT does promote melting
Several groups found that melting took ~17 minutes on table top	A black surface alone (light absorption as source of heat) does not promote melting
A couple groups found that other metallic materials promoted melting nearly as fast at MT (iron skillet, ring stand base)	The MT is not necessarily special in its composition since routine metal objects achieve the same outcome
Metallic objects (including MT) seem to allow faster melting: slowest materials were found to be plastic, clay, bubble wrap, wood (~ 30 minutes)	Metals conduct heat better than plastic or wood. Suggested that metallic bonding (mobile electron sea holding atoms together) was responsible, vs covalent bonding (electrons held in fixed positions) – harks back to readings
No metallic objects were faster than MT, but some were slower (sheet metal), aluminum pans	Different metals may conduct heat more or less easily [were the metal objects that were tested different in some other way besides composition?]
Whether the surface (of anything) was white or black did not matter much	No evidence that absorption of room light (which would be better for black surfaces) provided more heat for melting
In aluminum pan, melting was faster when pan was directly on table top vs being suspended in air.	Conduction from table to pan to ice was more efficient than from air to pan to ice. Room air is poorer conductor, and convection of air was not a factor.
Ice placed on a ring-stand ring suspending in air melted faster where it contacted the ring, vs where air lie underneath.	The underlying surface, especially if metal, conducts heat by contact to a much larger degree than does air.
IR temperature sensor showed temperature of surface of MT adjacent to the ice decreased (confirmed by several groups)	Direct evidence of removal of heat from the MT.
When water that was forming under the melting ice was removed, melting occurred faster.	Direct contact with the metal surface led to more efficient heat conduction. When water is present, the heat is conducted through the water, which slows the process.
Room temperature water placed directly on surface of room temperature MT did not change temperature (measured by digital thermometer)	The MT is not producing heat by some unspecified internal process.
Comparison of rate of melting when starting with 1, 2, 3 disks of ice. Rate of melting slowed proportional to the number of disks of ice.	If MT has a fixed amount of energy available, that is apportioned to the other objects in is in contact with, lessening the overall rate of melting.

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