Surface Temperature Distribution of an Improved Cook Stove

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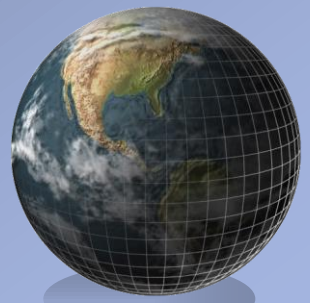
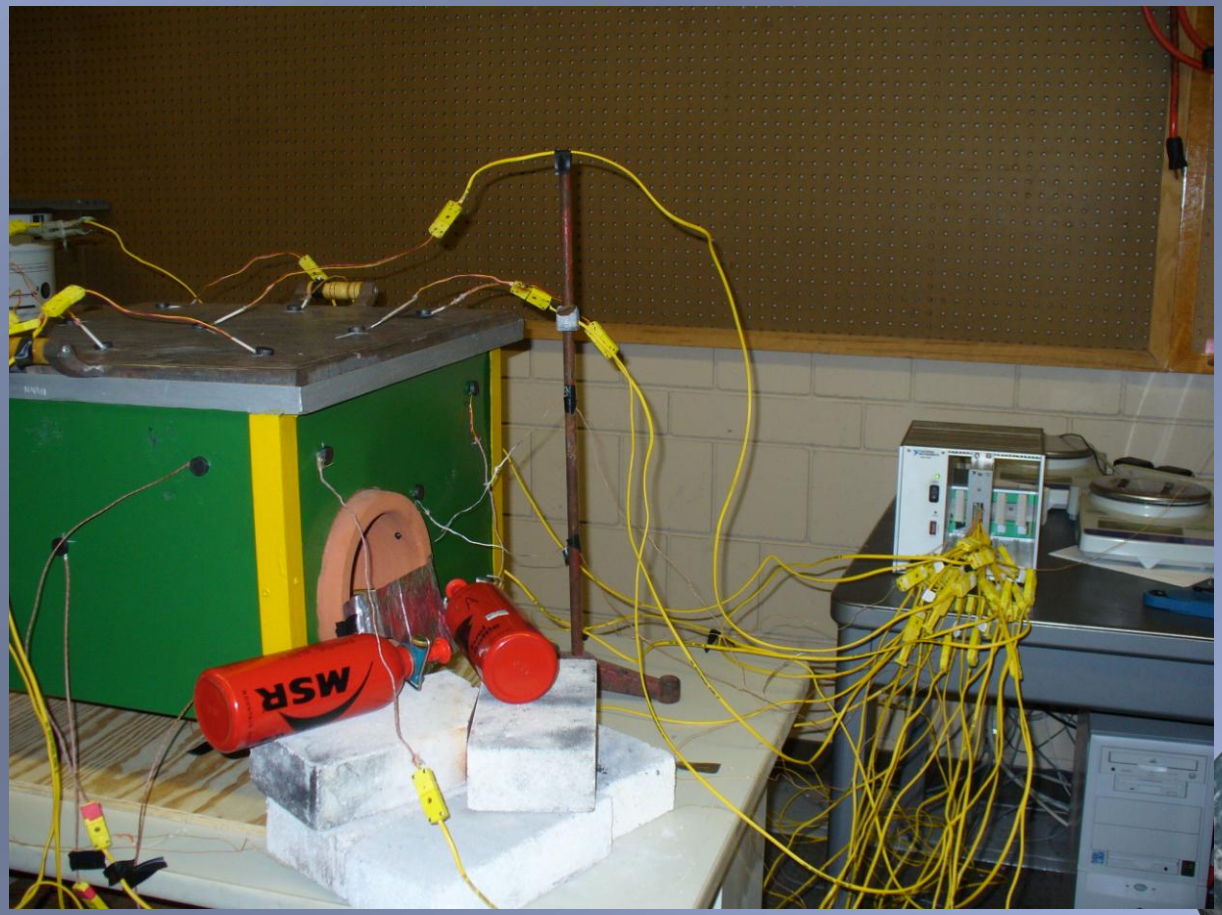
Background Information

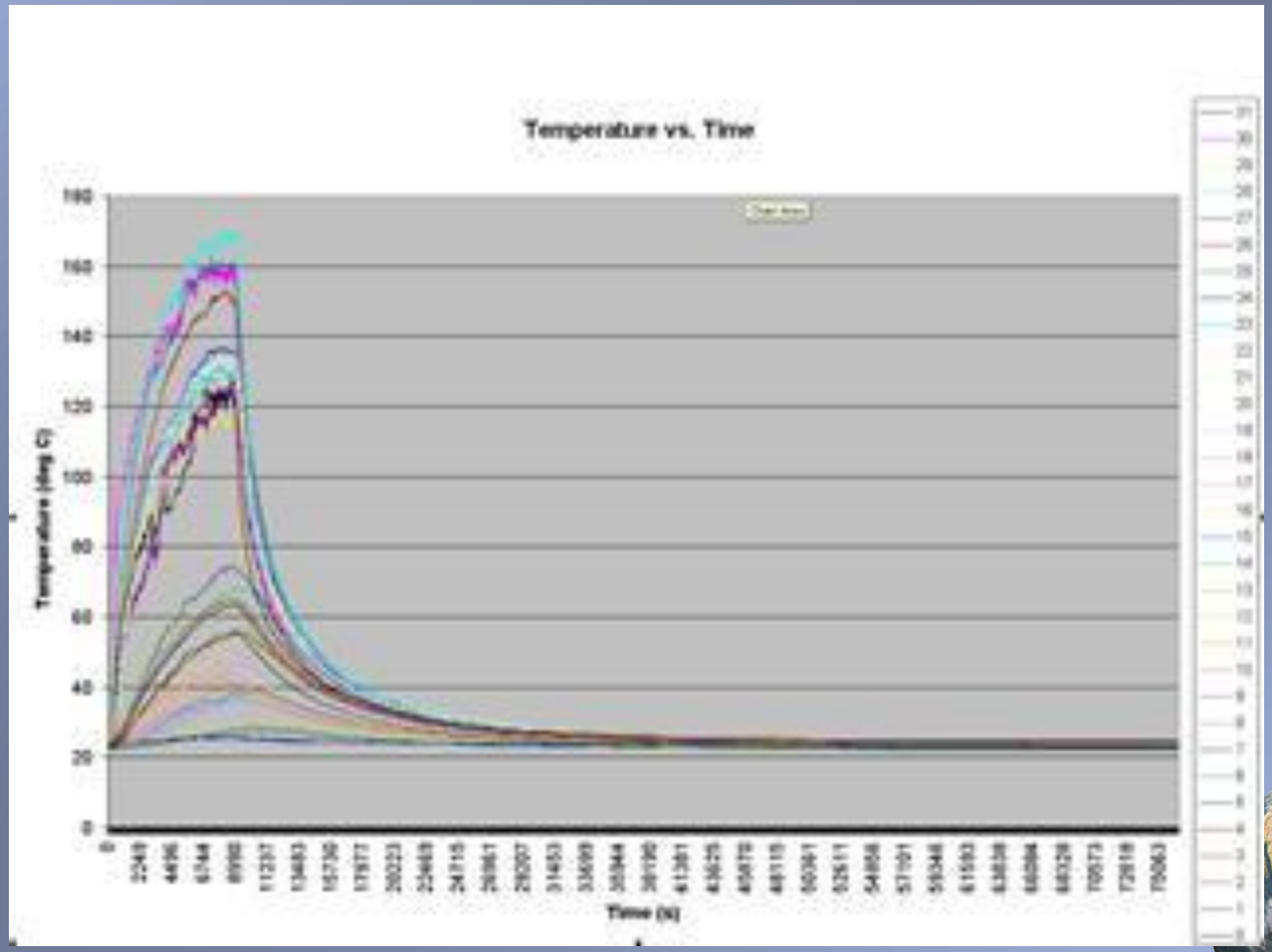
- Safety
- Environmental Concerns
- Cultural Considerations



Experimental Set Up



Safety Results

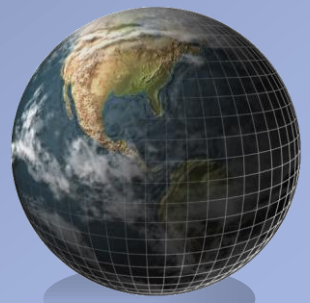


Conduction

- Quantity Energy is proportional to the change in Temperature.

Convection

- Quantity Energy is proportional to the change in Temperature.



Radiation

- Quantity Energy is proportional to Temperature to the Fourth Power. T^4

Radiant Energy Calculation

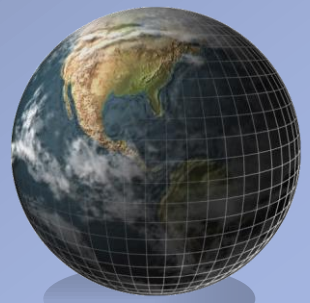
- Radiant Energy equals the emissivity of the surface multiplied by the Stephan Boltzmann constant multiplied by the area multiplied by temperature to the fourth.
- $Q_{rad} = \varepsilon \sigma A T^4$

Radiant Energy “lost” per side

– Front	571328. J	12%
– Right	364091. J	8%
– Back	305553. J	6%
– Left	458841. J	10%
– Bottom	590912. J	12%
– Top	2.52153×10^6 J	52%

Percent of Total Energy “lost” through Radiation

- Front 2%
- Right 1%
- Back 1%
- Left 2%
- Bottom 2%
- Top 8%
- Total Radiated from Stove 17%

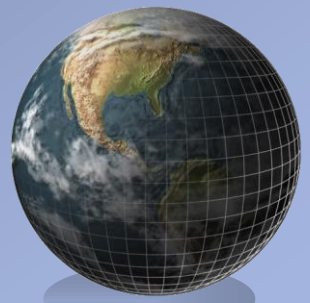


Convection Energy Calculation

- Convected Energy equals the convection coefficient multiplied by the area of the surface multiplied by the change in temperature.
- $Q=hA\Delta T$
- Convection Coefficient Properties
  - Fluid properties (Heat Capacity, Speed of Fluid, Flow Characteristics)
  - Surface properties (Texture)

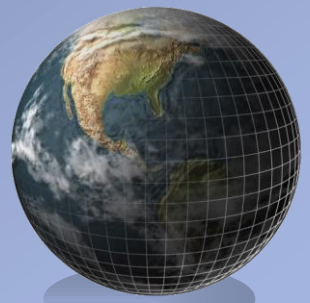
Percent of Energy “lost” through cooking surface

- 18% of the energy put into the stove came out the cooking surface.

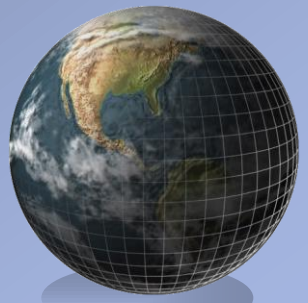


Procedural Issues

- Cooking situation
- Time
- Fuel used



Questions



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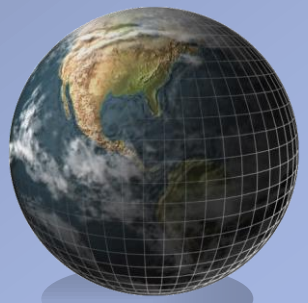
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