

Pillar of Fire

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Description: A fire is lit in a ceramic dish that has been mounted on a lazy Susan. The lazy Susan has a cylinder of screen wire attached. When the apparatus is spun, a pillar of fire grows to a height of about three feet.

Topics: Vortex formation, combustion, rates of reaction, convection currents

Materials: Lazy Susan or rotating spice rack (plastic variety)
About three feet of quarter inch screen wire (hardware cloth)
Evaporating dish and cork ring or pvc ring
Paper towels, lamp oil or lighter fluid, matches, baking soda

Procedure: 1) Assemble the apparatus shown below. Glue the cork ring in the center of the turn-table so it will not cause the apparatus to wobble.
2) Place a wad of paper towel in the dish and soak it with lighter fluid.
4) Light the oil soaked paper.
5) Carefully spin the apparatus and observe the flame.
6) Extinguish the flame by sprinkling baking soda into the evaporating dish.

Discussion: When the turntable is spun the screen wire catches air and pulls it along with it creating a vortex. Air is pulled into the vortex, which supplies oxygen to the flame. The heat causes gases to expand, and along with the vortex, creates a low pressure area in the center. This creates an upward convection current, and the flames take on the shape of the vortex.

Hazards: Wear safety goggles. Have a fire extinguisher nearby.

Clean-up: Carry the apparatus outside and dump the contents onto the ground. Pick up the unburned paper and put in a safe place to allow the remaining oil to evaporate. Discard what is left. Wipe the turntable clean with paper towels.

Reference: Tik L. Liem, Invitations to Science Inquiry, 2nd Edition, p.86.



