Homebrew Lightning Detector

This lightning detector experiment uses slightly radioactive Thorium from lantern mantles to help ionize the air around the edge of a razor blade, which is connected to an earth ground. Static electricity from a thunderstorm will flow from the ground, up through a milliammeter, and is dissipated into the storm through the razor blade. We were recently informed by a kind reader that Coleman® no longer uses Thorium in their mantles! So try mantles by other companies...Aladdin® mantles still use Thorium and work great for this experiment.

As static builds up before a lightning strike, the milliamp reading will increase until the lightning flashes and equalizes the electrical potential between earth and sky. At this time, the meter reading will drop to zero or negative, and then build up again until the next strike.

It is possible to predict how close to you lightning will strike by observing current readings and counting the seconds between the lightning and thunder.

The lightning detector actually helps **prevent** a lightning strike near it by dissipating static electricity, the same principle used in static discharge arrays that protect tall structures like antennas and windmill towers.

This project should still work without the Thorium from the lantern mantles--sharp metal edges and points will cause a current flow on their own, but the Thorium should increase the response and current flow. If you try this experiment with a plain razor blade, please let us know your results! Another factor that will influence your current readings is the quality of grounding.

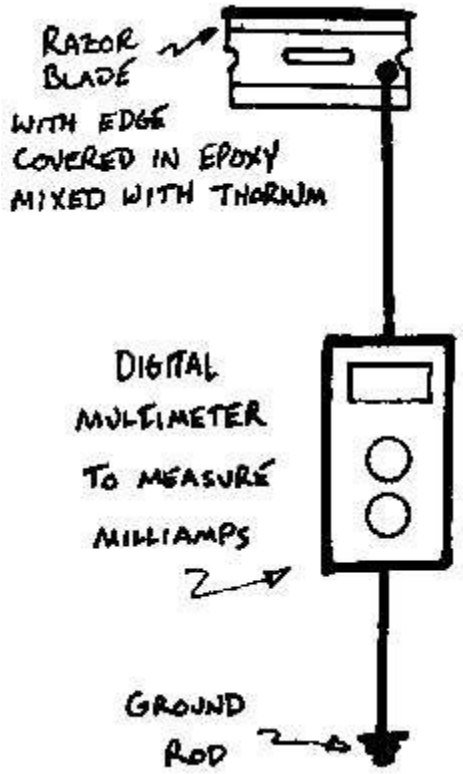
You Will Need:

- Razor blade
- Multimeter that reads milli- or micro- amps
- Ground rod (use existing house or telephone ground rod, or use a 3-4 foot length of 1/2 inch iron or copper pipe
- Small hose clamp
- 15-20 feet of wire (we used telephone wire)
- 5-minute epoxy
- 1 or 2 Alladin® lantern mantles
- 2 small alligator clips

1. First, hold the two lantern mantles over a plate with pliers, and carefully light them on fire. Collect the ash on the plate (and don't breathe any in). Mix up a small amount of 5-minute epoxy, and mix in the ashes thoroughly. Apply this paste all around the sharp edge of the razor blade about 1/16 inch thick.
2. While the epoxy is drying, Use the hose clamp to connect your wire from the ground rod to the multimeter.
    - Your existing ground rod (located underneath the telephone or electric service entrance box) is the easiest way to do this.
    - If you cannot find your ground rod, make one by pounding a 1/2" piece of iron or copper pipe into ground. Use wet ground if possible for a better ground connection. The dripline around your house works very well, but be careful of underground utilities when you drive in the rod.
3. When the epoxy is dry, mount the razor blade in a high place. We mounted ours a foot above the eaves on a wooden stick.
4. Fasten a wire to the razor blade with an alligator clip, and connect the other end to the multimeter.
5. Set the multimeter to measure micro- or milli- amps. Try microamps first--if your reading during a storm exceeds your meter's range, switch to milliamps.

Wait for a thunderstorm

and have fun!



Another suggestion we received was to use the Americium-231 sample from an ionization-type smoke detector as the radioactive source, with a steel needle pointed right towards it with a very small air gap. **PLEASE NOTE that there are many more dangers involved with the Americium-231 method than when using lantern mantles, which are fairly safe! Americium is a bone-seeker, and could permanently poison you. Check out the safety warnings we received from readers at the bottom of this page. Be sure you are a sane, sober adult before attempting to take apart a smoke detector.** Or better yet, stick with lantern mantles!

EXPERIMENT SAFETY INFORMATION
For doing this experiment using lantern mantles

-- Caution Required --

When using lantern mantles for this experiment, it's pretty safe. But don't breathe the smoke from the burning mantles! The detector does NOT attract lightning, it repels it. Don't breathe the smoke from the burning lantern mantles, and be sure you are not going to hit underground utilities if you drive a new ground rod. Be careful climbing on ladders or on your roof.

If you want to try using smoke detector guts for this experiment:

!!! - EXPERIMENT SAFETY INFORMATION - !!!

Our Own Safety Warning:

The Americium-241 used in smoke detectors is fairly safe, as long as it's securely enclosed in the smoke detector. Once you start tampering with it, you can put yourself and others in danger! This information simply documents OUR experimentation with lightning detection--we are not liable for any injuries that may occur as a result of your own experiments. SAFETY NOTE: After you remove the mesh cover over the radiation source in the smoke detector, USE CAUTION when installing it in your lightning detector. DON'T TOUCH THE THING, as the Americium-241 is fixed down with a layer of gold only a few atoms thick. If you touch it, the radioactive material could come loose and go anywhere. It's harmless UNLESS YOU INGEST IT. If ingested, it's a bone-seeker, and will be in your bones for the rest of your life. Am-241 is the most powerful way to get ionized air for this project available to the layman; that's why we were so excited about this project. SO PLEASE USE EXTREME CAUTION if you try this!

We will gladly accept, review and consider your science experiment submissions for inclusion on this site, whether you are age 6 or age 100! Email us for details.

Every experiment on these pages must be done with adult supervision only!!! If you are already an adult, we recommend getting a friend to help so you don't do anything childish and hurt yourself. We'll try to provide safety warnings, but cannot be held responsible for your own safety. Many of these experiments and many of the books we sell are from another era when safety was not a consideration, so PAY ATTENTION to the hazards of what you are doing! Wear safety goggles and gloves. Don't be stupid--YOU are supposed to be the adult here!

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