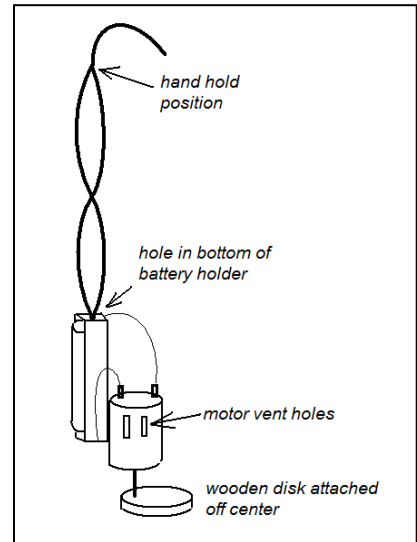


Assembling Your Motor on a String

- George Amann

1. Pass the pointed end of the string through the hole in the bottom of the battery holder (the end with the spring), and then knot the string so it can not slip out of the hole.
2. Attach the battery holder to the motor using the piece of two-sided tape. Be sure that the battery holder is above the end of the motor as shown in the diagram at right, and does not cover the motor vent holes.
3. Hold the motor and place your thumb on the end of the motor opposite the shaft. Place the motor shaft on the small, drilled hole in the flat wooden disc, and firmly press the motor shaft into the hole. (The motor shaft should be a force-fit into the hole).
4. Solder the wires from the battery holder to the motor (wire polarization does not matter). If the wires are too long, they may be shortened, but make certain they will not interfere with the shaft when it spins the disc.
5. Inserting the battery starts the motor spinning, removing the battery stops it.
6. With the motor spinning, suspend the apparatus from the string (making certain that the string does not get caught in the spinning disc), and move the suspending hand up and down until a standing wave appears. A larger amplitude wave can be obtained by gluing a penny onto the disc on the side opposite the shaft.



Suggestion for an Investigation Using the Motor

1. Time the revolution rate of the motor using a strobe.
2. Suspend various weights from the point where the battery holder attaches to the string, and measure how the wavelength of the standing wave varies with tension. Assuming the motor is constant frequency, determine the mass per length of the string.

Additional suggestions for activities and a parts list may be found on the AAPT web site www.AAPT.org. Click on "Partners", then "PTRA". Click on PTRA again to get to the PTRA homepage. At the bottom of the page, under "Forms and Links" click on "PTRA Activities" for additional information.

Parts List

item	source	catalog #	price
electric motor	Radio Shack	273-223	~\$2.99
1" dowel	lumber store	na	varies
AA battery	local	na	~\$1.00
string	craft store	na	varies
AA battery holder	Radio Shack	270-401	~\$0.99
carpet Tape	lumber store	na	~\$2.00