

Groovy Sounds

Pen, pin, paper phonograph

Introduction:

A classic (and classical) musical activity! Make a real record player out of simple materials.

Materials:

- A sharpened pencil
- A straight pin
- Piece of paper (the larger the better)
- LP – a vinyl record in reasonably good quality (not too many scratches)
- Tape
- This activity usually requires two people.

Assembly:

Making the turntable-

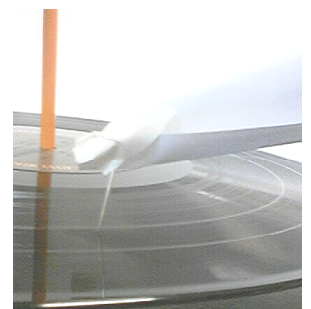
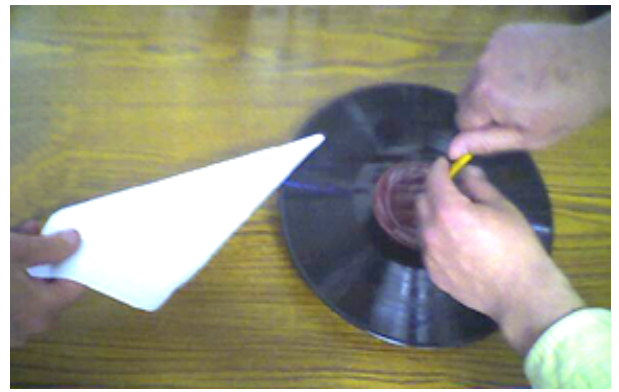
1. Slide the pencil into the hole of the LP.
2. Wrap some tape around the pencil near the sharpened point. The tape should be just thick enough to stop the pencil from passing back through the LP.
3. Push the LP onto the pencil and tape so that the pencil will not spin independently from the LP.
4. Make sure the pencil is perpendicular to LP.

Making the arm and sound cone-

5. Form the piece of paper into a cone.
6. Tape the cone together.
7. At the point of the cone, insert the pin. The pin should be inserted at an obtuse angle (more than 90 degrees) with respect to the cone (see photo to right).

To do and notice:

1. Hold your pencil and record on a tabletop like a top. The pencil point should rest on the table and the eraser end should be pointing up towards the ceiling.
2. Gently twirl your pencil, making sure your LP stays as parallel to the tabletop as possible. Turn the LP clock-wise. Try to turn the LP at 33 1/3 RPM.... Good Luck).
3. Hold the paper cone so that the pin is in a groove of the LP and gently hold the top of the open end of the cone.
4. Allow the cone to move with the motion of the record while the pin stays in the record's groove.
5. Listen to what comes out of the open end of the paper.

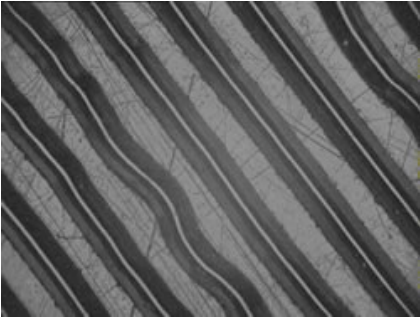


What's going on?

Music! Did you hear it?

Your turning record has a groove in it that spirals around and around towards the center of the album. This groove is not smooth. It has microscopic bumps and bends in it that corresponds to the music that is recorded on the album. As the pin rides in the groove, it hits these bumps and bends. These obstacles cause the pin and therefore the paper cone to vibrate up and down and side to side.

The vibrations in the cone causes the air to vibrate. These vibrations radiate out from the cone to your ear. ...and you hear music, voices or whatever has been recorded on the LP.



This is a microphotograph of the grooves of an old 78 r.p.m. phonograph record.

From: <http://www.lbl.gov/Science-Articles/Archive/Phys-quarks-to-blues.html>

Further investigations and inquiry:

1. Figure out and try things that will make the record player sound louder.
2. Come up with a system that will allow your record to turn at a constant speed.

