

Mainly Physics Workshop- Beachside Edition
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Demonstrations:

1. Transverse vs Longitudinal Waves
 - a. Using a slinky to send a longitudinal (p for pressure) wave
 - b. Using a telephone cord to demonstrate a pulse (soliton)
 - i. One movement down and back
 - c. Using a wave tank and wooden dowel to show waves with and without barriers to represent sand dunes, river jetties, etc.
2. Chladni Plate-vibration generator
 - a. metal plate riding on a speaker cone, turning up the volume makes plate bounce.
 - b. Adding sand, increasing frequency to form patterns, using different shaped plates for different patterns
 - c. Modeling waves and sandbars/shorelines
3. 2 liter bottles, two attached
 - a. demonstrating vortexes
 - b. could relate to weather- hurricanes etc.
4. Tray of sand to demonstrate meteors/comets
 - a. Dropping ball bearings/ marbles with different weights- disappearing under the sand, leaving a crater behind
 - b. Adding differential layer (coco powder) then dropping a ball
 - i. Knocks darker material off top, exposes brighter underlying material
 - ii. Moons of our different planets look like this- relating it to the materials they are made of. For example ice, nitrogen and mercury
 - iii. Tholin molecules
 - c. Heat and Temperature- liquid nitrogen
 - i. -320 F boiling point
 - ii. Volume increases by a factor of 700.
 1. Similar to steam
 2. Showing pressure build up with pipe and rubber stoppers.
 - iii. Volume of gas in completely dependent on container

1. Balloon filled with air, put balloon into liquid nitrogen.
 2. Air is colder and takes up less space, balloon shrinks.
 - iv. Pour liquid nitrogen into balloon- liquid heats up to gas, gas expands, balloons pops
 - v. Leiden frost effect-
 1. Pouring liquid nitrogen on the floor creates gaseous layer to roll around on
 - vi. orange, banana, racquet ball in Styrofoam container. Frozen within minutes.
- d. Tesla coil
1. electrical discharge of $\frac{1}{2}$ million volts
 2. lightning bolt = 1 trillion
 - a. what happens when it hits sand, glass