Demonstration Updates

Here are some items you may have missed plus some new items not yet on web site.

SUMMER 2012

1. Thermodynamics (4B40.41) This apparatus has a shiny metal plate and a black metal plate on opposite sides of a bulb like that used for brakes and turn signals in cars. Thermometers are places next to each plate. A 12v battery is connected to the bulb. Will the temperature of the metal plates change at the same rate or differ?
2. Electricity & Magnetism (5K20.26), Newton’s Third Law (1H10.11) Put a copper tube on one side of a pan balance and adjust weights for zero reading on scale. Drop one of the small but strong magnets down the tube. Eddy current will produce a field that slows down the magnet. The magnet exerts a force on the tube that can be detected by the apparatus no longer being balanced. The effect is like the weight of the tube had increased. You may want to use the short tube with a slit so magnet is visible. Optional: Use a web camera to show image on screen in large rooms like Parker 307.
3. Optics (6D20.16) & Modern Physics (7B10.14) Have you looked at the spectrum of a CFL bulb using a diffraction grating? Instead of a continuous spectrum like that from an incandescent bulb you may see a discrete spectrum. It is like looking at a row of bulbs producing different colored light.
4. Modern Physics (7F20.05) Device to demonstrate space-time curvature in general relativity available. Surface curves depending on mass placed in center.
5. Electricity & Magnetism (5G40.10) A homemade device that along with an oscilloscope demonstrates magnetic hysteresis.
6. Electricity & Magnetism (5H30.10) The cold cathode Crookes tube is being replaced by a hot cathode tube. Besides showing the effect of a magnetic field on the electron beam you can also show the effect of an electric field like that used in an oscilloscope. The cold cathode tube will still be available for those who want to use it.
7. Electricity& Magnetism (5H10.20) Due to changes in the Jumping Wire apparatus, a new device, called a Sturgeon’s Galvanometer, can be used to show the effect of an electric current on a compass that was discovered by Oersted.
8. Thermodynamics (4D50.45) A glass tube containing bromine is cooled in liquid nitrogen and allowed to warm back up to show diffusion. Assembled as needed. Ask 48 hr ahead of time or supply your own LN.

**Update Spring 2012**

1. Mechanics (1C10.06): Radar gun. Measure speed of a falling object or one of the cars/trucks available in Rm 239. Has a low speed limit that may be too low for use with people walking.
2. Magnetism (5H40.10): We now have a commercial device to demonstrate magnetic attraction and repulsion of wires carrying high currents to replace the homemade device.
3. Entropy/Reversible Process (4F10.10): You add food coloring to a liquid. Turn a crank to spread it out. Then turn the crank other way to reverse the process. Go to this web site for further information: <http://www.physics.brown.edu/physics/demopages/Demo/thermo/demo/4F1010.htm>
4. Modern (7A60.10): Electron diffraction device for use in quantum mechanics chapters to demonstrate wave behavior. Assembled as needed.
5. Mechanics (1C10.07): For mechanics there is now a remote controlled “Tiger Mobile” car.
6. Fluids (2B30.50): To demonstrate atmospheric pressure place this mat like device on a small empty cart and lift it up.
7. Fluids (2B30.48): Another way to demonstrate air pressure is to use the water filled “balloon in a flask” device. Air pressure pushes water out. Messy but entertaining.

 

1. Heat (4C30.10): Boil water using ice. Messy and dangerous. Use gloves. Heat the water on a hotplate and then put in stand shown below. Put ice on top. Pressure drop due to cooling allows boiling to occur.

 

**Update 2011**

1. Mechanics (1D50.11): Centripetal force demonstration. Balls in a container filled with water are spun around. Will the balls move in, out, stay in place or jump all about?
2. Thermodynamics (4F10.40): To go along with “Exploding Fuel” (demonstrates what happens in car engine especially if you use ethanol) we have “Burning Powder”. This illustrates what happens can happen in a silo filled with dust. Spray lycopodium powder into a beaker with a candle burning at the bottom. Beaker fills with flame. A piece of wood with a hole is placed over beaker to protect your hand.
3. E&M: Magnetic Accelerator (5H40.32). Sometimes called Rail Gun. Demonstrates F= I x dL x B. Rod moves along rails due to magnetic force acting on current flowing through rod. Common textbook problem.
4. Mechanics (1N30.11): If you did Newton’s colliding balls or large billiard ball version in 1500/1600 you may want to show the magnetic ball version in 1510/1610. What happens if the first ball hit by moving steel ball is a magnet?
5. Optics (6C & 6D): A blue-violet laser pointer is available to go along with red and green in diffraction and interference demonstrations. Puzzle: Why is the image bright white if you shine this laser on orange paper? Any guesses.
6. E&M (5A10.15): Arbor Scientific has developed a device to tell if those rods used to charge up an electroscope are positive, negative or either depending on what you rub the rod with.
7. Fluids (2B40.54): Auburn Halloween Special: Why do some things float and some things sink? A visual aid involves a ball floating in orange colored water. The ball has a football and blue glitter material floating in a liquid inside the ball. This is a 3 in 1 demonstration. The curved surface of the beaker acts like a lens causing the ball to appear larger that it appears in air. Also shows color mixing. The glitter material that looks blue in the air looks more like green when viewed through colored water. Football fans: you may be able to buy the football in a round ball in Haley bookstore.
8. E&M (5E40.26): Combine the fruit powered clock and the charge a capacitor through a light bulb to get a slow way of charging up a capacitor. Put two “apple batteries” in series. Slowly charge up the capacitor. Connect a low voltage flashlight bulb to capacitor and observe flash as capacitor discharges through the bulb. Also works with a buzzer. **Bring your own apples or lemons.**
9. Mechanics (1M40.40): Ballistic Pendulum Illustrates conversion of kinetic energy to gravitational potential energy. Common lab experiment and textbook problem.
10. Mechanics (1D50.12): Mutant flying pig. Eats batteries. Swing it around and use as a visual aid when talking about circular motion. Demonstrates textbook problem involving an object hanging from a rope or string while moving in a horizontal circle.
11. Mechanics (1Q40?): Jumping Tiger. Does a backflip and lands on its feet. Use as a visual aid when talking about circular motion.
12. Modern (7B10.12): If you want to show an emission **band** spectrum in addition to usual line spectra use Nitrogen spectrum tube.
13. E&M (5D30.30): Glowing pickle. For a visual aid in talking about voltage, current and resistance connect a Variac to a pickle. As you raise the voltage the pickle will start glowing. **Bring your own pickle.** *Deadly dangerous*. Wear gloves. The circuit will be constructed behind a glass shield. The yellow color comes from the sodium in the salt in the pickle. The effect is similar to what happens in the spectrum tubes used to show line spectra.