

TEXAS A&M UNIVERSITY

PHYSICS LECTURE DEMONSTRATIONS

Colleagues,

The Physics Demonstration Program has been reorganized and updated for implementation in the new George P. and Cynthia Woods Mitchell Institute for Fundamental Physics and Astronomy and the George P. Mitchell '40 Physics Building. [Click here to view Thermodynamics Demonstrations.](#)

The labeling system of the demonstrations has also been changed. The new labeling will incorporate the Demonstration Classification System (DCS) suggested by PIRA, the Physics Instructional Resource Association. The goal of the PIRA Demonstration Classification Scheme is to create a logically organized and universally inclusive taxonomy giving a unique number to every lecture demonstration.

External website references have been added to the demonstration notes when possible. These references have information (historical and practical) to supplement the notes listed in the demo page.

If you are interested in using one of these demonstrations in your classroom, you may send me an email with your class information and the demonstration number and name. Please allow at least two class days notice for the demonstration requests.

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Thermodynamics

[Thermal Properties of Matter]

4A30.00 LINEAR EXPANSION OF METAL RODS (SOLID EXPANSION)

4A30.10 BIMETAL STRIP

4A30.20 BALL AND RING

[Change of State]

4C10.10 PVT SURFACES

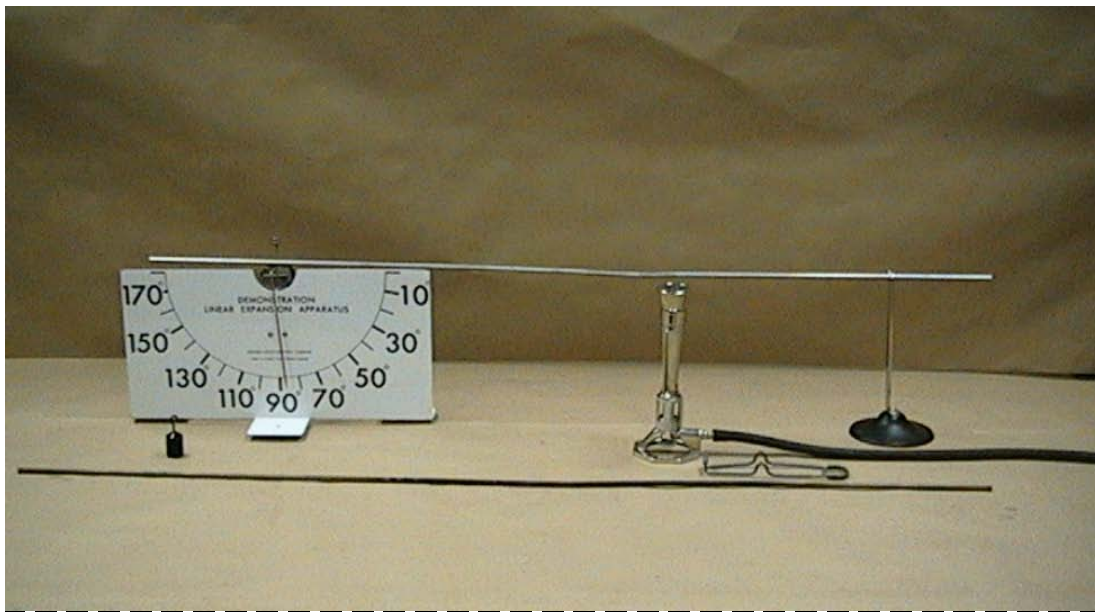
4C30.10 GEYSER

4C33.50 PULSE GLASS

[Kinetic Theory]

4D20.10 CROOKES' RADIOMETER

4A30.00 LINEAR EXPANSION OF METAL RODS (SOLID EXPANSION)



Apparatus: Tube support and scale w/needle
Aluminum tube (3ft long)
Brass tube (3ft long)
50g hooked mass
Bunsen burner and lighter
Gas from table outlet

Notes: Place one of the tubes on the tube support and put the 50g mass on the tube near the scale (used to weigh down the tube). The tube should rest on top of the indicating needle. Heat the tube evenly along its entire length. This procedure can only show that the two metal tubes expand when heated but cannot compare the coefficient of linear expansion since the tubes cannot be heated to the exactly the same temperature.

Resource: http://en.wikipedia.org/wiki/Coefficient_of_thermal_expansion

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4A30.10 BIMETAL STRIP



Apparatus: Bimetallic strip on holder
Bunsen burner and lighter
Gas from table outlet

Notes: Carefully heat the bimetallic strip evenly with the burner. It is made of a strip of brass and a strip of invar brazed together.

Resource: http://en.wikipedia.org/wiki/Bimetallic_strip

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4A30.20 BALL AND RING



Apparatus: Brass ring on holder
Brass ball on holder
Bunsen burner and lighter
Gas from table outlet

Notes: First, show that the ball will not pass through the ring. Heat the ring and the ball will pass in and out. CAUTION—REMOVE THE RING FROM THE BALL BEFORE IT COOLS.

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4C10.10 PVT SURFACES

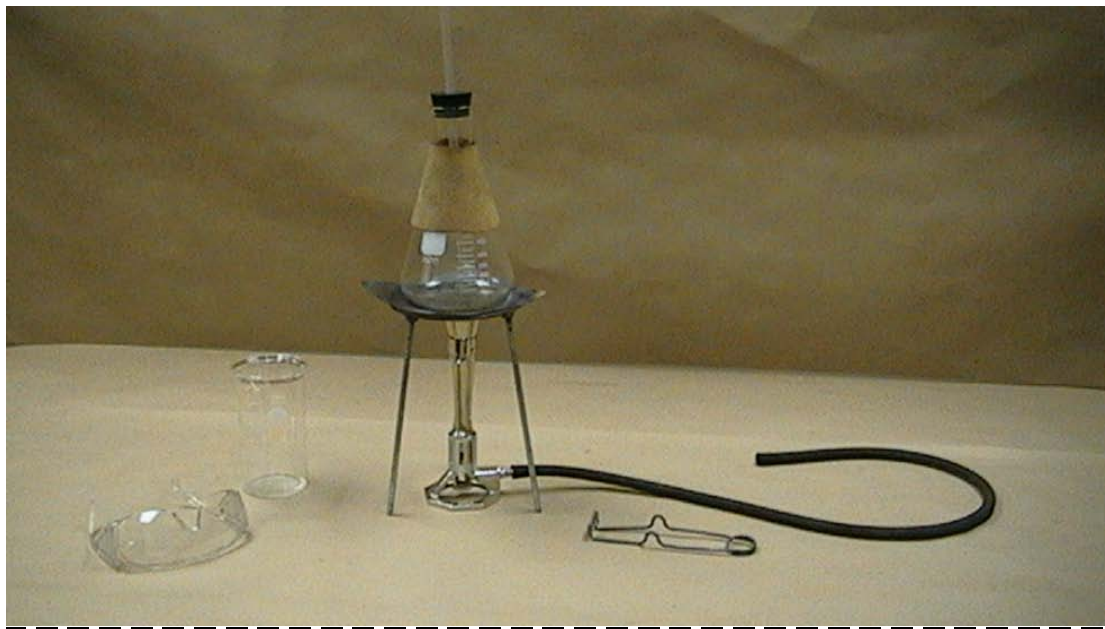


Apparatus: Ideal gas model
CO₂ model
H₂O model

Notes: Any or all of the above may be selected for use. The models represent the pressure, volume, and temperature relations. They are light weight and color-coded.

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4C30.10 GEYSER

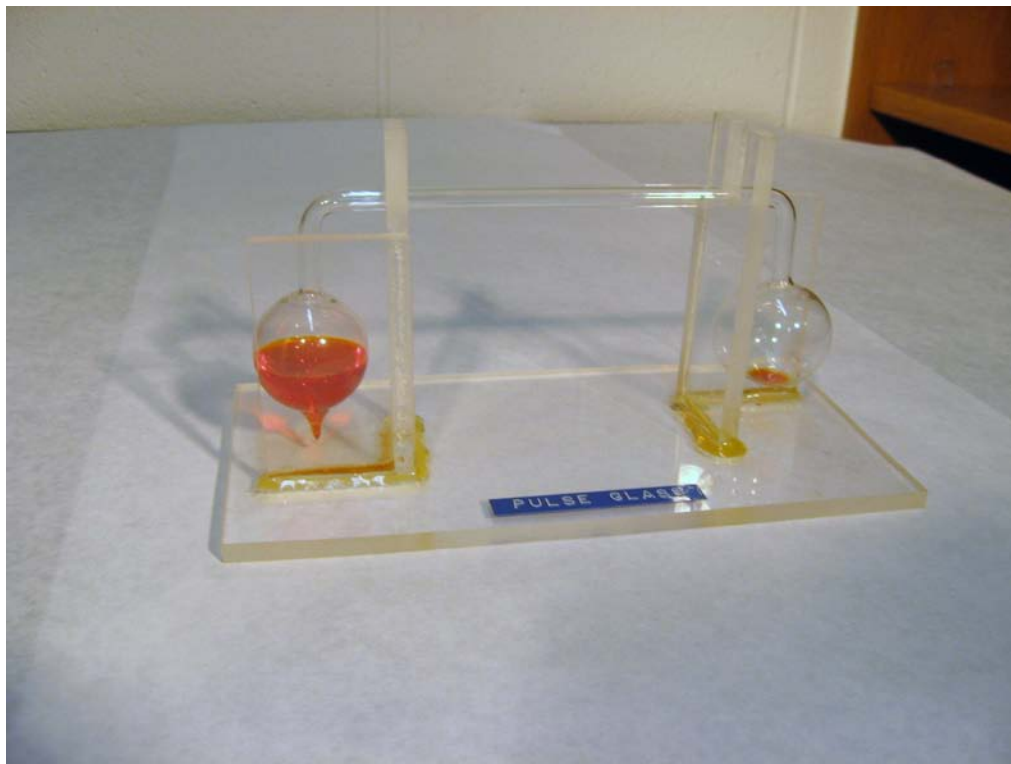


Apparatus: Bunsen burner and flint lighter
Ring stand and gauze
Safety glasses
Beaker with about 4 inches of colored water
Gas from table outlet
Flask with about 50mL of water, stopper and glass tube

Notes: Be sure to wear safety glasses during this experiment. Place the flask (which has a small amount of water in it) on the ring stand over the bunsen burner and heat the flask until the water boils. Pick up the flask by the insulated neck and turn it over. Put the glass tube (of the flask) into the beaker containing the water. A geyser of water will occur in the heated flask.

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4C33.50 PULSE GLASS



Apparatus: Pulse glass on stand

Notes: By holding the bulb (with all the liquid in it and with the pointed part up) in your hand, the liquid will pulse into the other bulb due to the increase of vapor pressure in the bulb (you are holding). The liquid in the pulse glass is under reduced pressure and has a low boiling point. Caution – do not use any hotter heat source than your hand.

Resource: http://www.csun.edu/scied/1-demo/pulse_glass/index.htm

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4D20.10 CROOKES' RADIOMETER



Apparatus: Incandescent bulb on base
Radiometer

Notes: Demonstration about heat transfer and conservation of momentum with photons.

Resources: <http://www.answers.com/topic/crookes-radiometer-2>
http://www.strangeapparatus.com/Crookes_Radiometer.html

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