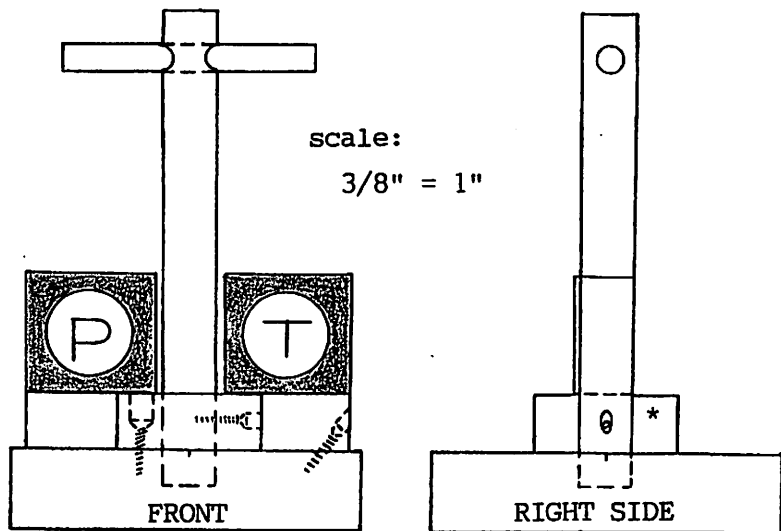teaching
The Gas Laws - A model of a cylinder (large beaker) with a piston (all wood) to help
illustrate and explain the gas laws (kinetic theory of gases).

scale:

3/8" = 1"

FRONT   RIGHT SIDE

I used a 2000 ml beaker I had on hand.
(The more common 1000 ml beaker would
do.) The piston is about 4 15/16" in
dia. and 1 1/16" thick (5/4" pine).
The handle is 3/4" dia. dowel, about
6 5/8" long, with a "cross" dowel of
3/8" dia. and 3½" long. The "gauges"
are 3/4" pine. I used only screws to
fasten everything together (no glue
or nails), two 1¼ x 10 FH and four
7/8 x 4 FH (RH would do).

* a 3/4" pine block, 2" sq.

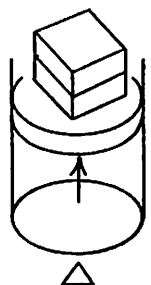The "gauges" are drawn on 1 3/4" sq.
copy paper, cut out, and pasted on.
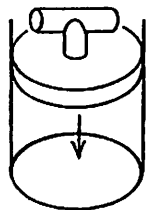
piston
pushed
down

(Boyle's Law)
If $T_{constant}$:

$$\frac{P_1}{P_2} = \frac{V_2}{V_1}$$
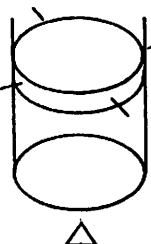
$$P_1 V_1 = P_2 V_2$$

piston
"floats"
freely
upward

(Charles' Law)
If $P_{constant}$:

$$\frac{V_1}{V_2} = \frac{T_1}{T_2}$$

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$

piston
"locked"
in

If $V_{constant}$:

$$\frac{P_1}{P_2} = \frac{T_1}{T_2}$$

$$\frac{P_1}{T_1} = \frac{P_2}{T_2}$$

General Gas Law:

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

(T in °K)