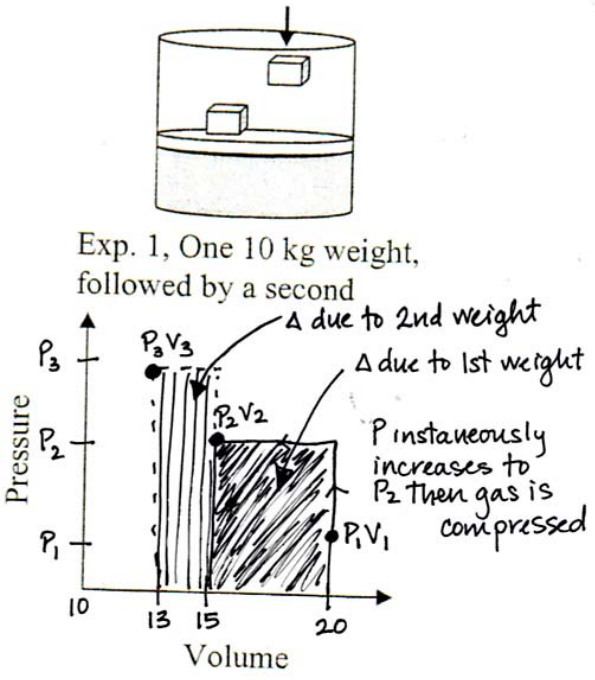
Name:_____

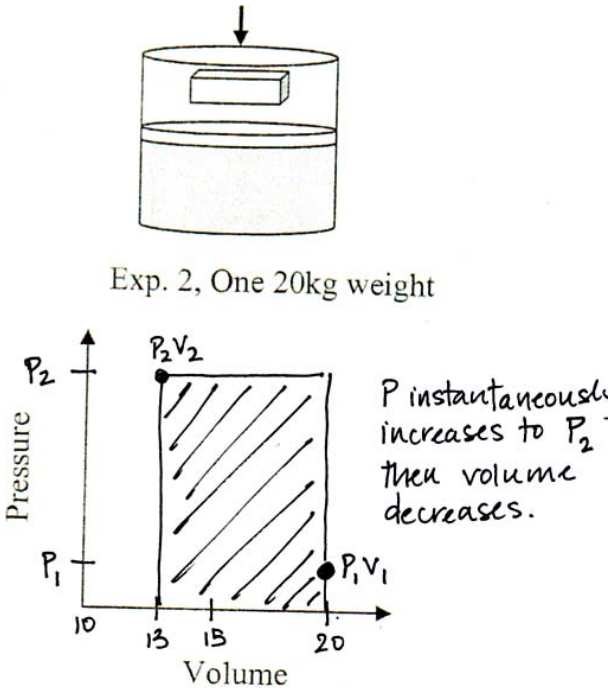
Break-out session #4: work

1. When the stops are pulled out, the air in the container expands against the weight of the block. Was work done **by** or **on** (1) the air in the container, (2) the block, (3) neither or (4) both.

Work is done by the air on the block/surroundings. The process corresponds to an expansion so work is negative.

2. A 10 kg weight is dropped on a piston and ***compresses*** the air underneath from 20L (V_1) to 15L (V_2). Then a second 10 kg weight is dropped on the piston and the gas is compressed from 15L (V_2) to 13 L (V_3). A second experiment is performed in which one 20 kg weight is dropped on the piston and the gas is compressed from 20L (V_1) to 13 L (V_2). On each axis below sketch the external pressure vs. volume for the two experiments. Label the graph completely.





3. How does the amount of work done compare for the two experiments? No calculations needed! What implication do you think this has for the amount of work done during compression for a reversible vs. irreversible reaction?

More work is done in experiment #2 than in experiment #1 because the area under the curve is greater. The implication is that the amount of work done on the system during a compression will be greater if the process is carried out irreversibily than if it were carried out reversibly, i.e. $|w_{irrev}| > |w_{rev}|$ *and the minimum amount of work that can be done for a compression corresponds to the reversible process.*