

AP Physics: Short Lab 12-A
Isobaric & Isovolumetric Processes

Name _____ Hour _____

Lab Partners _____

Purpose:

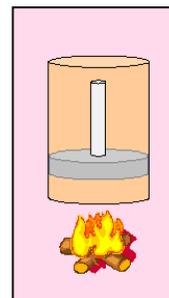
Analyze relationships between work, heat, and internal energy occurring in isobaric and isovolumetric processes.

Equipment:

- Interactive Physics computer software

Procedures: Isobaric Processes

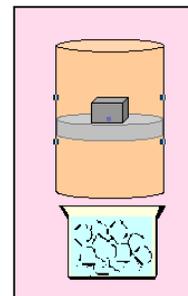
1. Open the Interactive Physics file “*Isobaric (I-A)*”. The simulation shows a cylinder with a movable piston containing an ideal gas. The cylinder is then brought into contact with a hot reservoir and the piston begins to move upwards. Run the simulation and observe the measurements of the gas and the Pressure-Volume graph produced. Use the 1st Law of Thermodynamics to predict the signs (positive, negative, or zero) of the quantities below for this process:



Work: _____ Heat: _____ Δ Internal Energy: _____

2. Open the Interactive Physics file “*Isobaric (I-B)*”. The simulation shows the same situation as “*Isobaric (I-A)*,” with the addition of the amounts and signs of work, heat, and change in internal energy as the process is completed. Run the simulation and use the data to check your predictions from Question #1. Were any of your predictions incorrect? If so, what clues could you use to determine the correct answer next time?

3. Open the Interactive Physics file “*Isobaric (II-A)*”. The simulation shows a cylinder with a movable piston containing an ideal gas. The cylinder is then brought into contact with a cold reservoir and the piston begins to move downwards. Run the simulation and observe the measurements of the gas and the Pressure-Volume graph produced. Use the 1st Law of Thermodynamics to predict the signs (positive, negative, or zero) of the quantities below for this process:

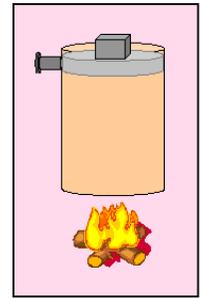


Work: _____ Heat: _____ Δ Internal Energy: _____

4. Open the Interactive Physics file “*Isobaric (II-B)*”. The simulation shows the same situation as “*Isobaric (II-A)*,” with the addition of the amounts and signs of work, heat, and change in internal energy as the process is completed. Run the simulation and use the data to check your predictions from Question #3. Were any of your predictions incorrect? If so, what clues could you use to determine the correct answer next time?

Procedures: Isovolumetric Processes

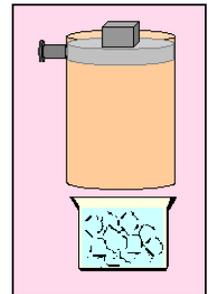
1. Open the Interactive Physics file “*Isovolumetric (I-A)*”. The simulation shows a cylinder with a piston containing an ideal gas. The piston is fixed in place and the cylinder is then brought into contact with a hot reservoir. Run the simulation and observe the measurements of the gas and the Pressure-Volume graph produced. Use the 1st Law of Thermodynamics to predict the signs (positive, negative, or zero) of the quantities below for this process:



Work: _____ Heat: _____ Δ Internal Energy: _____

2. Open the Interactive Physics file “*Isovolumetric (I-B)*”. The simulation shows the same situation as “*Isovolumetric (I-A)*,” with the addition of the amounts and signs of work, heat, and change in internal energy as the process is completed. Run the simulation and use the data to check your predictions from Question #1. Were any of your predictions incorrect? If so, what clues could you use to determine the correct answer next time?

3. Open the Interactive Physics file “*Isovolumetric (II-A)*”. The simulation shows a cylinder with a piston containing an ideal gas. The piston is fixed in place and the cylinder is then brought into contact with a cold reservoir. Run the simulation and observe the measurements of the gas and the Pressure-Volume graph produced. Use the 1st Law of Thermodynamics to predict the signs (positive, negative, or zero) of the quantities below for this process:



Work: _____ Heat: _____ Δ Internal Energy: _____

4. Open the Interactive Physics file “*Isovolumetric (II-B)*”. The simulation shows the same situation as “*Isovolumetric (II-A)*,” with the addition of the amounts and signs of work, heat, and change in internal energy as the process is completed. Run the simulation and use the data to check your predictions from Question #3. Were any of your predictions incorrect? If so, what clues could you use to determine the correct answer next time?