Name: _____

Covariation in Thermal Systems

Working in small groups (2 or 3 people), solve as many of the problems below as possible. Try to resolve questions within the group before asking for help. Each group member should then write up solutions in their own words.

Orient: The surfaces represent measurements on a kilogram of water vapor in a piston (a graduated cylinder with a moveable top). The green surface is $U(S, V)$ and the red surface is $U(T, p)$. Each surface has a corresponding contour plot.

As you increase the temperature of the system, what happens to the internal energy of the water vapor?

Explore: As you increase the volume of the system, what happens to the internal energy of the water vapor?

Coordinate: Describe how p, S, T, U, and V change if your system goes from the blue dot state (point A) to the green triangle state (point D).

Describe how each variable changes if your system goes from the blue dot state (point A) to the green triangle state (point D) to the red star state (point C) to the black square state (point B) and back to the blue dot state.

Activity Evaluation
What was the main point of this activity?

Describe one thing you understand as a result of this activity.

Describe one thing that is confusing after completing this activity.