A *pressure cooker* is an enclosed pot that expels air and traps water vapor, which increases the internal pressure. This in turn raises the boiling point of water and allows food to cook at high temperatures.

Imagine you have a large industrial pressure cooker that holds 1 kg of water vapor. You would like to know how responsive the system is to changes in temperature. To do this, you need to determine a characteristic *rate*: the ratio of the amount of heat needed to change the temperature a small amount and the change in temperature (i.e., the amount of heat transferred per change in temperature).

The graph provided by your instructor shows internal energy and volume contours plotted on temperature and pressure axes.

1. **Estimate the Temperature-Responsiveness:** Use the graph to determine this temperature-responsiveness when the volume is held fixed. The initial state of the system corresponds to the black square. Describe your process.

2. **Reflect on Your Process:** Why do you think it matters that you held volume constant in the above estimate?

3. **Explore Dependencies on State Variables:** Does the value of your estimate depend on the value of the volume? the temperature?