You've now seen the First Law in its differential form:

$$dU = đQ + đW \tag{1}$$

which is true whether or not a change is quasistatic. You have also seen that for a quasistatic change $đQ = TdS$. The infinitesimal work $đW$ you might guess is something like $\vec{F} \cdot d\vec{r}$ like you learned in your introductory physics. However, we aren't examining a point particle, which might make the work on some blob of matter seem more confusing. In practice, it's actually simpler. Rather than force, we want to consider pressure, which is a (normal) force per area. The small displacement ends up being replaced by a small change in volume, which is a small (normal) displacement times an area. Finally, we end up with a minus sign because we define positive work to be energy *added* to a system by working, and to do work on the system we must decrease its volume. So we get

$$dU = TdS - pdV \qquad \text{quasistatic only!} \tag{2}$$

This is called the **thermodynamic identity**, and is just the First Law expressed for the case of quasistatic changes.

You'll use the thermodynamic identity very frequently, and because of that I want to remind you to also remember the First Law. Speficically because the First Law is true for *any* process, even one that is not quasistatic. Also becasue the First Law is written in terms of energy transfer to and from the system, while the Thermodynamic Identity is written soley in terms of properties of the system. Both are incredibly useful, but they're useful at different times and for different purposes.

If you decide to get a thermodynamics tatoo (which I don't recommend), my recommenation would be to choose the thermodynamic identity

$$dU = TdS - pdV$$