For our current system we assume the following

$$\frac{\partial u}{\partial t} = \alpha(x,y)(\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2})$$

where $\alpha(x,y)$ describes the diffusion constant at point $(x,y)$

We are also assuming that we are given an initial function $f(x,y)$ so that

$$u(x,y,0) = f(x,y)$$

This is being solved over region $R$

Let $n_{(x,y)}$ be the normal at point $(x,y)$.
We are assuming conservation hence

$$n_{(x,y)} \cdot \nabla_{(x,y)} u = 0$$

for $(x,y) \in \partial R$

To ensure that conservation happens we need to make sure

$$E(t) = \int_R u(x,y,t) dx dy$$

is a constant for every value of $t$

We should also know the values of $\frac{\partial u}{\partial x}$ and $\frac{\partial u}{\partial y}$

In summary, this is the list of things to know for each system. In each mathematica notebook, these will be computed:
1. Total energy is conserved
2. No energy flowing out at the border
3. Values of energy flow in x and y direction