Project Breakdown:

There are 3 parts to this project: choosing a system to explain in detail; creating a model of the system; writing a program using SCRATCH to make their model interactive. I put a bit of information in the packet, however, below is some more detail regarding each task.

- **SYSTEM (**Student chooses what system they want to research, model and explain)

We have left the door wide open for this project as far as what system the students might choose to work with. So for our definition of a system, we started in September saying that a System is a group of interactive, interrelated, or interdependent elements that form a complex whole. I had used the example of a coffee maker to relate to the students that there is input (coffee grounds and water), elements and interactions (heating coils to warm the water, tubes to carry the water to the grounds, filters to keep the grounds out of the pot, and so on), and an output (coffee!). We also discussed the boundaries as not only being the physical dimensions of the coffee maker, but also things a little less tangible like the types of grounds used, the purity of the water, the temperature of the brewed coffee, the time it takes to complete the process. After that, pretty much everything we have done in PACE, we have related back to a system. (Their instruments they made, snow and weather, the polymers we created, candy pumpkin towers, water purification, fundraising, factories, toys, computers…)

If we can name a valid input and output, list the elements and define how those parts interact within a boundary, we have a system. However, I am encouraging them to think about the complexity of their systems before they finalize their ideas. In class, I used a pinwheel as a system to model the project, and showed them what their final product might look like and do. (If you have time next Tuesday or Thursday and you can come to Walton, I can show you what I showed them.) A pinwheel is a much simpler system to model than a car or an animal. However, with the project being open-ended, we can focus on general or specific parts of a larger system like a vehicle. This week it is my goal is to meet with each PACE student and help guide them in their project by completing the systems concept map. I think it will be much easier to work on a model after that!
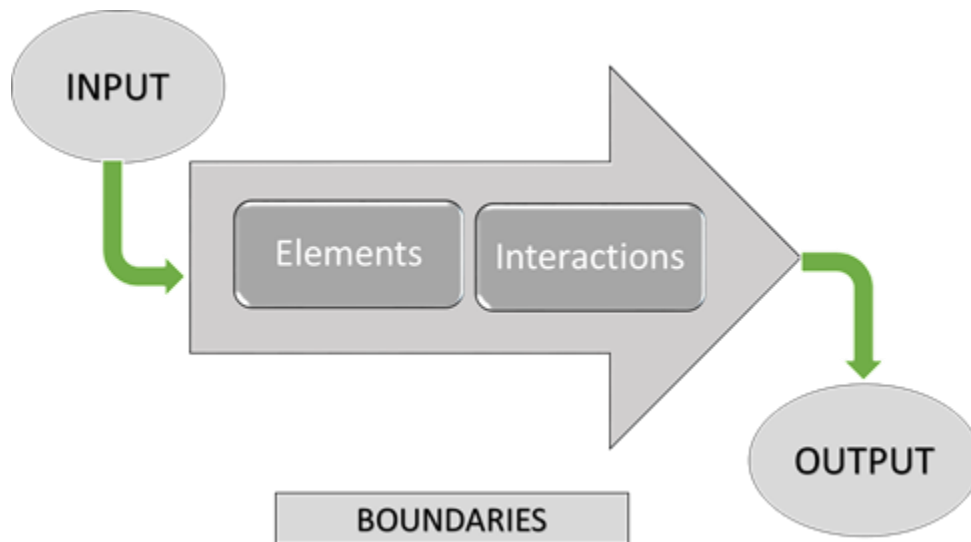
- **MODEL:** (completed mostly at home)

The student will create a 3-D model from non-conductive materials showing all the components of their system. It can be a pre-fabricated model (like a LEGO set or plastic model) or can be made from other materials (fabric, cardboard, wood, cardstock, and so on). The model should be small enough to fit on a school desk and have all the components of their system (from above) visible or able to be revealed. There is no need to purchase something expensive, and we really want the students to be involved in the construction/ assembly of the model as much as possible.

- **SCRATCH PROGRAM:** (completed mostly at school, but can be done outside of PACE)

Scratch is an online website that helps students understand and create their own computer code. We have been learning how to use scratch in PACE for the last month and a half. I will be assisting the students throughout the next 2 ½ months with this at school as well as providing work-time, but since it is online, they can work on it wherever they have access to a computer (tablets and phones do not work with SCRATCH) and internet access.

In the end, we will put all 3 phases together along with a device called a Makey Makey in order to make their physical 3D models interactive.