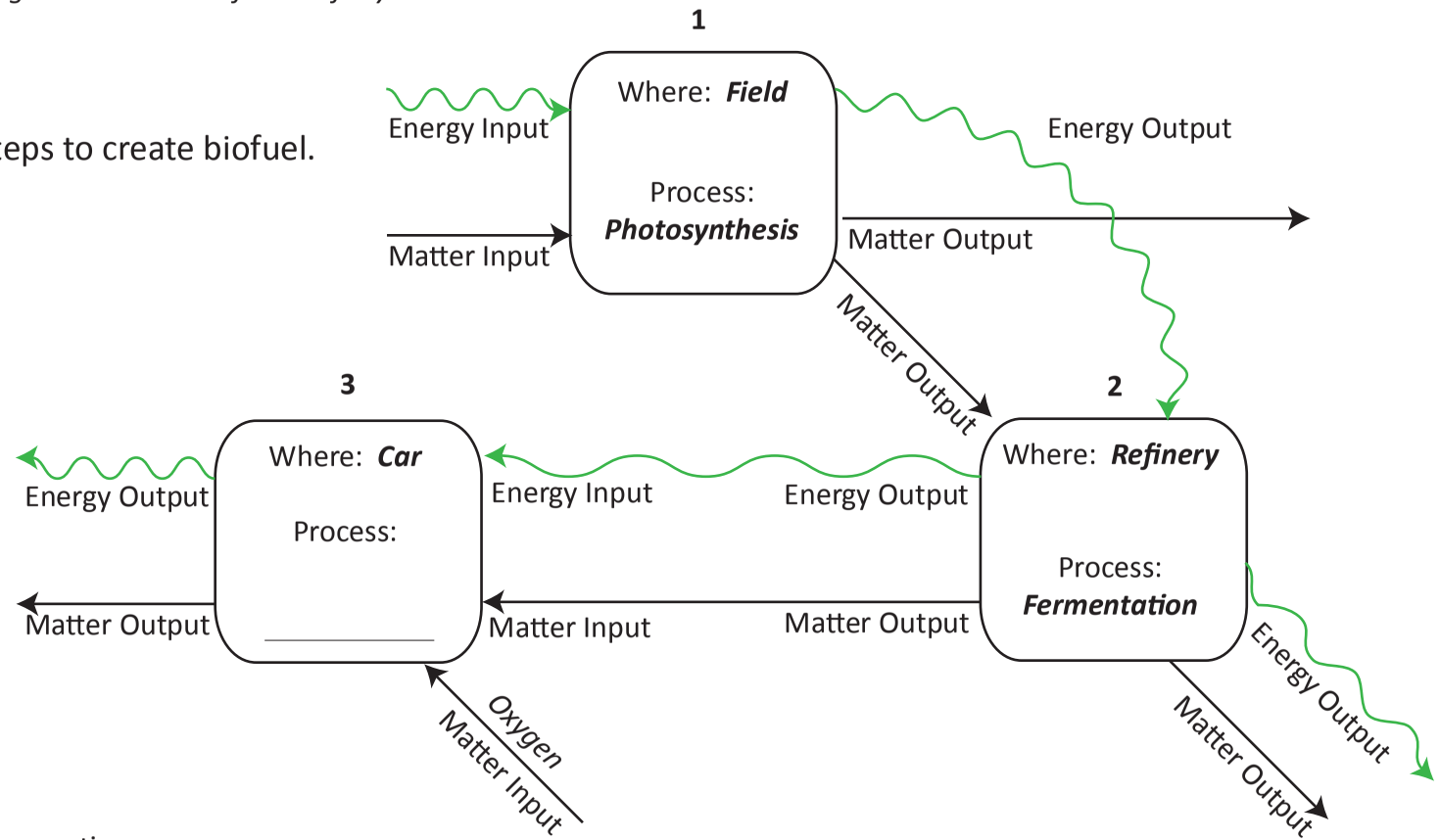
Life Cycle Assessment Process Tool

Demonstrate the flow of energy and matter through this system to make ethanol. Enter the correct energy input and output above the wavy lines and matter input and output above the straight lines. Pay attention to stages with more arrows than the others. Determine which inputs and outputs stay in the system and which "escape." The first page follows the energy from the field to the refinery to your car. The second page shows additional inputs needed to create the fuel. Fill in the "process" occurring at any stage where it is not filled in for you.

Primary steps to create biofuel.



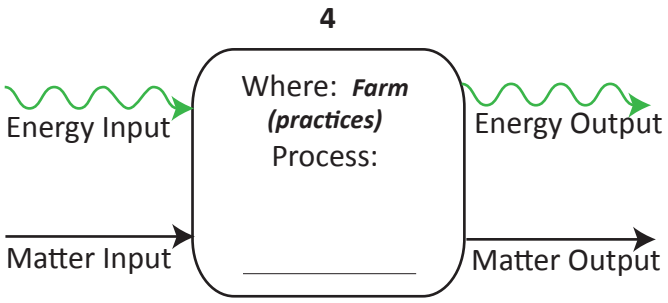
Follow-up questions:

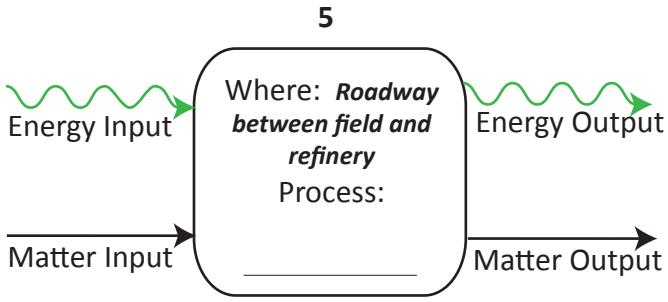
1. What is the relationship between the matter output from #3 to the matter input in #1?

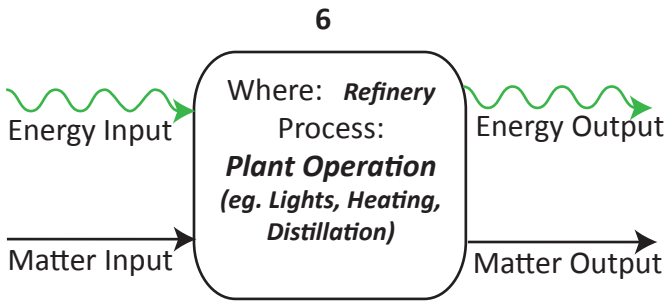
2. Does all energy put into #1 make it to the energy output stage of #3? Why or why not?

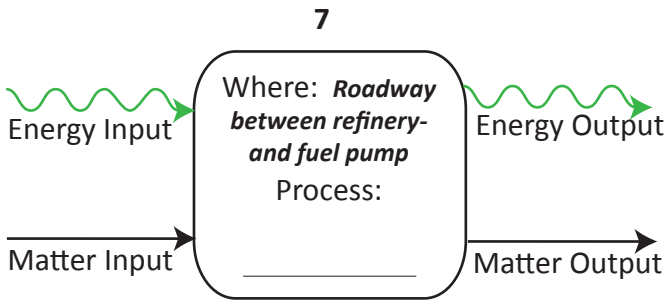
3. If we are conducting a life cycle assessment for energy or greenhouse gases, like carbon dioxide, why can't we stop at stages 1-3? Why do we need to include stages 4-7 as well?

Additional inputs to create biofuel.









Follow-up questions:

1. Describe how you would determine the net energy gain or loss for ethanol production. Write an equation using only the relevant steps. You can abbreviate EI for Energy Input and EO for Energy Output (eg. EI #1 - EO #7=).

2. How do you think you could best improve the energy efficiency of this process? Reduce the carbon footprint?