Critical Questions for Systems and System Models:

What are the limits of this system?
What other systems affect this system? How?
What parts and subsystems make up this system? How do they work together?
What are the inputs and outputs of this system?
What interactions and processes involve this system?
What are the advantages to thinking about this as a system?
In what ways is this system like other I have learned about? How is it different?
What is accurate and inaccurate about our model of this system?
How can our systems model be made more accurate?
Engineering- How can we improve the function of the system?

Critical Questions for Stability and Change:

What causes change in this system?
What causes stability in this system?
Are there feedbacks that make this system more or less stable?
What is the time scale for this system to remain stable or change?
If the system is stable, what would cause it to change?
If the system is changing, what would make it become stable?
Is the stability static or dynamic?
How does stability and change in this system compare with other systems I have learned about?
Engineering- How can we make the system more stable? How can we make it change?

Critical Questions for Structure and Function:

How does the function depend on the structure?
How does the structure support the function?
Are there other structures that can serve the same function?
How does this relationship between structure and function compare to others that I have learned about?
How does the structure limit the function?
Engineering- How can the structure be improved? How can the function be improved?

Critical Questions for Patterns:

Is there a pattern?
What is the evidence for this pattern?
Do similarities and differences reveal a pattern?
Is this pattern real or imagined? (People sometimes see patterns where there isn't one.)
What predictions can I make based on this pattern? Can I test them?
Is there a cause for this pattern? What is it?
What other crosscutting concepts can be applied to this pattern?
Engineering- How widely can this pattern be applied? What are its limits? Can I use this pattern to design a solution?

Critical Questions for Cause and Effect:

What evidence is there for a cause and effect relationship?
How can this cause and effect relationship be tested?
What are other possible causes? Are there many causes?
Is the cause and effect relationship real or imagined?
How is this cause and effect relationship similar to and different than others I have learned about?
Engineering- How can I use this cause and effect relationship in my design?

Critical Questions for Energy and Matter:

How are energy and matter related in this system?
Where does the energy for this system come from? Where does it go?
What does energy do in the system? How is it changed?
What is the role of matter in this system? How does it change? How does it enter/exit the system?
Is the role of energy and matter in this system similar to other systems I have learned about? How is is different?
Engineering (energy)- How can we improve the energy efficiency of the design?
Engineering (matter)- If we change the materials, does that improve the design?

Critical Questions for Scale, Proportion, and Quantity:

How would this phenomena we are studying look at the micro or nano scale?
How does this interaction affect the global scale?
How does this system look at a smaller and larger scales? What is new? What is the same?
How does this scale relate to you? How much bigger or smaller is it than what you are used to experiencing?
How can we study nature at this scale?
How can we accurately measure this at this scale?
Engineering- What is involved in making this process take place at an industrial scale?

Adapted from http://crosscutsymbols.weebly.com