**PREREQUISITES:** Students have knowledge of aquaponic systems including photosynthesis, ecosystems, nutrient cycles and creating systems network diagrams (See **Lesson 4** and **“So, What is Aquaponics?”*system network diagram activity*** to get re-familiarized with system network thinking).

**Planning the investigation:**

1. **Define the Problem:** *(a testable question)*
2. **Investigation goal:** *(what do you intend to do?)*
3. **Gather Information:** *What do you need to test? Why? Is it measurable? How?*

* How could we grow a vegetable crop in the classroom? (describe)
* What are the necessary materials (and resources)? (list)
* What are each of the variables we need to measure? Explain why. (list)

**4. How will you know you have successfully carried out the plan? Use nodes (variables) to explain.**

**5. Diagram of the solution**:

* Draw a design for your aquaponics model (on a separate 11 x 17 sheet). Describe the purpose of each part of the system model (ex. “*Wick: to bring nitrogen-rich water to plants”)*. Label each of the “nodes” (the input and outputs of the system). Refer to the sample [materials](https://docs.google.com/document/d/1pmZEdMyg84MZ8KGq5psBxR6Ju93_jehGLg8pwUjLeJ4/edit?usp=sharing) (example) on display to design the model.

**6. Testing the Solution:** ***Describe the data that you will collect to answer the question***

* **Is the system operating efficiently (in balance/homeostasis)? What is a data collection strategy to determine this?** Write a description of the data collection process and methods you will use to monitor the system.
* ***Was enough food grown to meet the challenge?* How will results be measured and analyzed to evaluate the design? (**methods and calculations)   
  *(HINT: see “Harvesting / biomass measuring techniques”)*

**7. Make a prediction about the outcome for this Design of a Solution:   
*(****Example: “This system design will produce \_\_\_ grams of lettuce, using 5 liters of water in a month. This will be an (increase/decrease) when compared to the global average water footprint of the same amount of lettuce which is calculated at \_\_\_\_ liters of water in a month.)*

**8. If the predicted outcome result is different: What are 3 possible design changes that could positively affect this outcome? Explain.**

**Now you are ready to carry out the plan using** [**Building and investigating an aquaponics model system**](https://drive.google.com/open?id=1H9203ZXvGhj3tP3TvOJUxs285BUnagX-8LDnZYr6Vvo)**.**