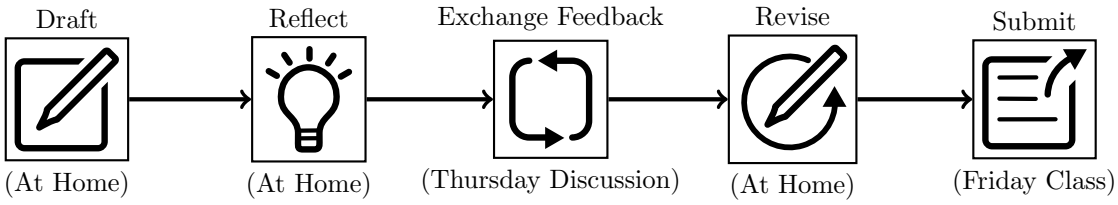
The PAR Process



Note: Your PAR (both initial and final drafts) must be typed in LaTeX.

Problem Statement

The alien world Robotron is inhabited by billions of tiny nanobots. These nanobots all share a common source of power, and their speed is directly proportional to the total amount of energy shared among all the nanobots.

One day the nanobots decide to beam their energy into space. So, they all form lines, march to the edge of their colony, and send a tiny portion of their shared energy into space. Since the nanobots are very polite, after an individual nanobot has sent its energy into space, it moves aside and lets the next nanobot take a turn.

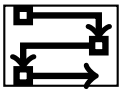
1. Suppose the nanobots live in a tube with an opening at only one end. Come up with a differential equation to model the amount of energy left in the nanobot colony over time.
2. How does your model change if the nanobots live in a disk where energy can be launched from anywhere on the perimeter? What about a sphere?
3. Newton's law of cooling states that the rate of change of temperature of an object is proportional to the difference between the object's temperature and the ambient (outside) temperature. Does this law relate to your model for the nanobots? If so, how?

Reflection

Turn the page and check off the icons for things you think you did well; circle the icons for things you would like feedback on.

Feedback Provided By:_____

Suggestions Communication **Strengths**

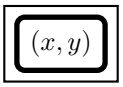


Show All Steps

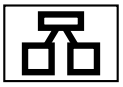
Explain Why,
Not Just What

Avoid Pronouns

Use Correct
Definitions

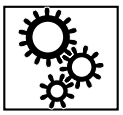


Define Variables,
Units, etc.

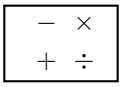


Create Diagrams

Suggestions Accuracy **Strengths**



Correct Setup



Accurate Calculations

Solve Multiple Ways

Answer Reasonable

Other
(Write Below)