

# 5 Tips on How to Prepare for SCUDEM

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# Tip 1: SCUDEM is All About TEAMWORK!

- ▶ To be successful, you need to do three things:
  - ▶ Create a model for the problem
    - ▶ It helps to try and find another model that you can tweak to fit the problem
    - ▶ Think of all the variables that can cause changes in the system that your problem describes
  - ▶ Simulate or solve the model
    - ▶ Usually requires writing a MATLAB or Python program (other languages/methods can work too)
  - ▶ Present your model
    - ▶ Create a PowerPoint/Slides presentation
    - ▶ Create a video explaining your model and thought process for the judges
- ▶ Make sure to **COMMUNICATE** with your team!



# Tip 2: Practice, Practice, and Practice!

- ▶ SCUDEM Problems fall into 3 categories
  - ▶ Physics/Engineering
  - ▶ Chemistry/Life Sciences
  - ▶ Social Sciences
- ▶ Try and get at least 1 practice problem done with your team so you can get a feel for the difficulty and time needed for the competition
- ▶ Practice using your software of choice to simulate/solve differential equations
- ▶ Focus on creating clear, logical models and defending your logic



# Tip 3: Use a Numerical Solution

- ▶ Most differential equations do not have an analytical solution!
- ▶ Use methods such as Euler's, Runge-Kutta, Finite Difference Method, etc...
- ▶ Be cautious about the step size you choose!
  - ▶ Large step sizes can result in inaccuracies
  - ▶ Small step sizes increase computational costs
  - ▶ Depending on your system of differential equations you may even need to adjust your method
- ▶ Check your solutions
  - ▶ Make the step size progressively smaller to see if it your model converges



# Tip 4: Manage your Time Wisely

- ▶ 3 weeks may seem like a lot of time, but time really flies by (especially if you're a high schooler working on college apps)
- ▶ Allocate time each week to work on each component of the project
  - ▶ Brainstorming a model
  - ▶ Simulating/solving the model
  - ▶ Preparing a presentation
  - ▶ Recording the video



# Tip 5: Work on the Presentation

- ▶ SCUDEM is about both solving and presenting your solution
  - ▶ Use visuals to clarify your model
  - ▶ Keep your presentation engaging and concise
  - ▶ Practice your presentation with your team
    - ▶ If necessary, just film a single slide at a time and then splice the clips together.
- ▶ Remember, the judges will only see your video



**BONUS: Have fun!**

